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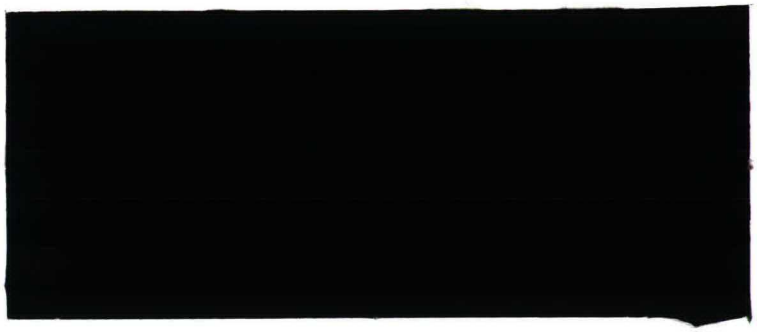

# MOTIVES FOR THE USE OF EQUITY-WARRANTS BY DUTCH COMPANIES

Chris Veld



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by

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[1] The author is research fellow at Tilburg University. The first draft of this paper, which contained only section 2 and part of section 4 of the current paper, was titled "Motives for the use of warrant-bond loans in corporate finance". This first draft was accomplished while the author studied at the "School for Banking and Finance" of the "Institute for Post-doctoral Studies (TIAS)" at Tilburg University. The author wishes to thank the members of his examination committee, prof. dr. J.J. Sijben and especially drs. P.J.W. Duffhues for helpful comments and suggestions on this first draft. In addition the author thanks drs. P.J.W. Duffhues and prof. dr. P.W. Moerland for their comments on the second draft of this paper. Of course all remaining errors are the sole responsibility of the author.

# MOTIVES FOR THE USE OF EQUITY-WARRANTS BY DUTCH COMPANIES. [1]

Contents:

## 1. Introduction.

In this paper motives for the use of equity warrants will be discussed. An equity warrant, from now on to be referred to as a warrant, is the right issued by a company[2] to buy a certain number of new shares in this company against

conditions determined at the issuance date (amongst other things these conditions include the exercise period and the exercise price)[3]. Our analysis relies heavily on the existence of market imperfections, such as accounting and fiscal aspects. In order not to complicate the analysis too much, we restrict our discussion to motives for warrants issued by Dutch companies in the Dutch capital market.
Warrants originate in different ways. They may be the result of a "pure" finance transaction, e.g. the issue of bonds or stock in combination with warrants. It is also possible that warrants are used as e.g. a form of employee compensation or dividend payment. Duffhues (1990) presents scheme 1 in which possible warrant originations are summarized.

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Scheme 1: Warrant originations:
a) an issue in combination with bonds;
b) an issue in combination with common or preferred stock;
c) as a separate issue for cash;
d) as a (partial) payment for a merger or take-over;
e) as a reward for investment banker's services;
f) in a reorganization;
g) as a dividend payment;
h) in an anti-takeover amendment;
i) as a form of employee compensation;

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From January 1, 1976 to December 31, 1990 36 Dutch companies made 42 issues in which warrants were involved[4]. A complete list with the names of the companies and the years the warrants were issued is included in appendix A. Because 6 companies issued 2 different warrants[5] at the same time (generally referred to as warrants A and B), in total 48 warrants were issued. Three of these warrants have been listed in US dollars, 1 warrant has been listed in Canadian dollars and the other 44 warrants have been listed in Dutch guilders. 44 Warrants have been listed on the Official Market ("Officiële Markt"), three warrants have been listed on the Parallel Market[6] ("Parallelmarkt") and 1 warrant (Compudata) has first been listed on the Parallel Market and later on the Official Market (under the name "Tulip Computers"). In

table 1 these 48 warrants are classified according to scheme 1.

Table 1: Warrant issues in the Netherlands, made by Dutch companies from 1976 to 1990.

| | Number of issues | Number of different warrants |
|---|---|---|
| In combination with bonds | 21 | 27 |
| In combination with: | | |
| - common stock | 9 | 9 |
| - preferred stock | 1 | 1 |
| Separate issue (for cash) | 6 | 6 |
| As payment for a merger | 2 | 2 |
| as dividend payment [7] | 3 | 3 |
| Total number | 42 | 48 |

From table 1 we can conclude that the issue of warrants in combination with bonds was the most common use of warrants in our research-period. These issues made up 50% of the number of issues and even 56% of the total number of different warrants issued. The remaining 21 warrant-issues consisted of 10 issues of warrants in combination with common or preferred stock, 6 warrants issued for cash and 5 warrants issued for miscellaneous reasons.

In finance literature motives for the use of warrant-bond packages are generally included in discussions about motives for the use of convertible bonds. That is why our discussion starts in section 2 with a review of motives for the use of convertible bonds, which can also be applied for warrant-bond packages. In section 3 the choice between convertible bonds and warrant-bond packages on one side and packages consisting of put-warrants and common stock, generally referred to as puttable common stock, on the other side will be discussed. In section 4 differences between convertible bonds and warrant-bond packages will be discussed, followed

by the impact these differences may have on the company's choice between an issue of convertible bonds and an issue of warrant-bond packages. In section 5 we will pay attention to motives for the use of warrant-bond packages, followed by section 6 where we will review motives for the several possibilities to use separate issues of warrants. In section 7 the use of warrants in an anti-takeover amendment will be discussed and in section 8 the benefits for the use of warrants as a form of employee compensation will be reviewed. The paper finishes with a summary and some conclusions.

## 2. Motives for the use of convertible bonds and warrant-bond packages.

### 2.1. Introduction.

In the introduction we have already mentioned the fact that in finance literature motives for the use of warrant-bond packages are generally included in discussions about motives for the use of convertible bonds. Therefore we will discuss motives for the use of convertible bonds, that can also be applied to warrant-bond packages, in this section. The choice between convertible bonds and warrant-bond packages will be discussed in the next section.

In this paper we will use the most common definition of a convertible bond: a convertible bond is the combination of a bond and a non-detachable warrant; this warrant may only be exercised by redeeming the accompanying bond[8]. Furthermore we assume in this paper that conversion is only possible at the redemption date[9].

Because in this section only motives for the use of convertible bonds are discussed that can also be applied to warrant-bond packages, the term convertible bond refers in this section also to warrant-bond packages. This is also the case for the term "warrant", this term refers to both warrants and conversion rights.

In this paper we will distinguish "traditional motives"

(section 2.2) and "modern motives" (sections 2.3 and 2.4) for the use of convertible bonds. The discussion starts with the traditional motives.

## 2.2. Traditional motives.

### 2.2.1. Introduction.

Traditional motives for the use of convertible bonds are[10]:

1) they allow companies to sell stock at a premium over the current stock price;
2) they are a cheap source of capital because they carry coupon rates below the market rates of interest on straight debt;

These motives reached much support in surveys made by Brigham (1966), Hoffmeister (1977) and Melicher and Hoffmeister (1977).

The survey held by Brigham (1966) indicated that 68% of the financial officers used convertible debt because they believed that their stock would rise over time and that convertibles would provide a way of selling common stock at a price above the existing market price. Another 27% said that their company wanted straight debt but found conditions to be such that a straight bond issue could not be sold at a reasonable rate of interest.

The most important conclusions that could be drawn from the questionnaire held by Hoffmeister (1977) is that the desire to sell common stock on a delayed basis was selected as most important motive by 34% of the firms surveyed, and was named as a motivational factor by 70% (that is first, second or third choice) and that the desire to reduce the interest cost of a debt issue was given as most important motive by 30% of the firms, and was involved in the motivation of 58%.

The survey held by Melicher and Hoffmeister (1977) indicated that the most important reason for the issue of convertible debt was the reduction of interest costs of the debt-issue. Somewhat less important was the fact that common stock could

be sold at a price above the prevailing market price.
In the next sub-sections we will see that none of the traditional motives makes much sense.

2.2.2. "A deferred sale of stock at an attractive price".

There are two reasons why an issue of convertible bonds can not be considered as a deferred sale of stock at an attractive price.
In the first place, a conversion price of e.g. ƒ 75, which must be paid after 5 years in order to acquire common stock may not be compared with the existing market price of e.g. ƒ 50. This future price of ƒ 75 must be compared with the then prevailing price of the common stock. It is possible that the stock price will be ƒ 125 over 5 years. In that case the company certainly does not sell common stock at an attractive price. In fact the company suffers a substantial opportunity loss[11].
The second objection against this motive is that it is not sure whether stock will be issued in the future. An issue of stock will only take place if the conversion rights will be exercised. This will only occur if the future stock price exceeds the exercise price[12]. Therefore it can be concluded that an issue of convertible bonds can not be qualified as a deferred sale of stock at an attractive price.

2.2.3. "A cheap form of capital".

The fact that convertible bonds carry low coupon interest rates does not mean that they are a cheap form of capital. The price that is paid for a convertible bond can be divided in two parts: a part that is paid for the straight debt-value and a part that is paid for the conversion rights. Because the conversion rights can in fact be considered as "implicit warrants", we will refer to the conversion rights as "warrants" in the remainder of this sub-section.
Copeland and Weston (1988, page 476) argue that using the

Capital Asset Pricing Model (CAPM) and the Black and Scholes (1973) model (B/S-model) the cost of a convertible bond issue can be calculated as a weighted average of the cost of straight debt and the cost of the warrant[13]:

$$k_{cv} = k_b * \left[\frac{B}{B + W}\right] + k_w * \left[\frac{W}{B + W}\right] \quad (1)$$

where:
$k_{cv}$ = cost of a convertible bond-issue;
$k_b$ = cost of a similar straight debt-issue;
$B$ = the bond-value of the convertible bond-issue;
$k_w$ = cost of a warrant;
$W$ = warrant-value of the convertible bond-issue.

By means of illustration we calculate the cost of two convertible bond-issues. A convertible bond-issue made by a medium risk company (company M) and a convertible bond-issue made by a high risk company (company H). The characteristics of both issues are summarized in table 2[14].
Both companies are assumed to be non-dividend paying.
The bond values of the convertible bond-issues can be calculated using equation (2):

$$B = \sum_{t=1}^{n} \frac{I}{(1 + k_b)^t} + \frac{F}{(1 + k_b)^n} \quad (2)$$

where:
$B$ = the convertible bond's value as a straight debt instrument;
$I$ = dollars of interest paid each year;
$F$ = bond's redemption value at maturity;
$k_b$ = cost of a similar straight debt issue;
$n$ = maturity of the bond.

After substituting the variables 1 to 4 from table 2, a bond value of ƒ 897.04 results for company M. The bond value for company H is somewhat lower, i.e. ƒ 844.46.
The values of the warrant-parts of the convertible bond-issues can be estimated using the B/S-model[15]:

$$C = SN(d_1) - Xe^{-rf(T-t)}N(d_2) \quad (3)$$

where:
C = the price of a warrant;
S = the price of the underlying stock;
X = the exercise price;
T-t = the time to maturity;
$r_f$ = the risk-free interest rate;
N(.) = cumulative standard normal distribution;
$d_1 = \frac{\ln(S/X)+(r_f+\sigma^2/2)(T-t)}{\sigma\sqrt{(T-t)}}$
$d_2 = d_1 - \sigma\sqrt{(T-t)}$;
$\sigma$ = the standard deviation of the firm's equity rate of return.

Table 2: Characteristics of the convertible bond-issues made by Company M and Company H.

| | Input-factor | Sym-bol | Risk-class Medium Company M | Risk-class High Company H |
|---|---|---|---|---|
| | Bonds | | | |
| 1 | Coupon interest (year) | i | 11% | 11.25% |
| 2 | Face value[16] | F | *f* 1000 | *f* 1000 |
| 3 | Cost of a similar (non-convertible) debt-issue | $k_b$ | 14% | 16% |
| 4 | Maturity of the bond | n | 5 years | 5 years |
| | warrants | | | |
| 5 | Stock price | S | *f* 50 | *f* 50 |
| 6 | Exercise price | X | *f* 75 | *f* 75 |
| 7 | Maturity of the warrant | T-t | 5 years | 5 years |
| 8 | Risk-free interest rate | $r_f$ | 10% | 10% |
| 9 | Standard deviation of the firm's equity rate of return | $\sigma$ | 0.1205 | 0.2183 |
| 10 | Conversion ratio[17] | | 13.333[18] | 13.333 |
| 11 | Beta of the company's stock | $\beta_s$ | 1.2 | 2.4 |

If the variables 5 to 9 from table 2 are substituted in equation (3) a warrant price (C) of *f* 7.72 results for company M and a warrant price (C) of *f* 11.67 results for

company H. The value of the warrant-part (W) of the convertible bond issue results if the conversion ratio (in both cases 13.333) is multiplied by the warrant-price (C). The warrant values (W) of company M and company H are respectively ƒ 102.96 and ƒ 155.54.
The last parameter from equation (1) that must be estimated is the cost of a warrant. According to Copeland and Weston (1988, page 476) this variable can be determined using the Security Market Line (SML) from the CAPM:

$$k_w = r_f + [E(r_m) - r_f]\beta_w \qquad (4)$$

where:
$E(r_m)$ = the expected return of the market portfolio;
$\beta_w$ = the systematic risk of the warrant;
$E(r_m)-r_f$ = the market price of risk per unit beta.

We assume a market price of risk ($E(r_m)-r_f$) of 6%. Using the CAPM and the B/S-model Copeland and Weston (1988, page 476) derive an equation for the calculation of $\beta_w$:

$$\beta_w = \beta_c = \int \beta_s \qquad (5)$$

where:
$\beta_c$ = the beta of a call-option written on the same firm, without warrants;
$\int$ = the option's elasticity = $(\delta C/\delta S)(S/C)$;
$\delta C/\delta S$ = the factor $N(d_1)$ from the B/S-model;
$\beta_s$ = the systematic risk of a share of common stock[19].

Using equations (2) to (5) it is possible to determine the input factors which are necessary to calculate the cost of the convertible bond loan. If these factors are substituted in equation (1) the costs of the convertible bond loans result, which are presented in table 3.
From table 3 we can conclude that the cost of the warrants is well above the cost of straight debt. This causes the cost of the convertible bonds to be higher than the cost of straight debt. In table 3 it can be seen that the cost of the warrants, 42.09% and 51.35% respectively, is also above the cost of equity, 17.20% and 24.40% respectively. Jarrow and Rudd (1983, pages 120-121), prove that in case $\beta_w$ is

calculated using the B/S-model (as is done in this paper) it is always above the beta of the underlying common stock. This implies that the cost of warrants is above the cost of common stock[20].

Table 3: the costs of the convertible bond loans issued by the medium and high risk company.

| Input-factor | Sym-bol | Risk-class Medium Company M | Risk-class High Company H |
|---|---|---|---|
| Straight debt value | B | *f* 897.04 | *f* 844.46 |
| Warrant value | W | *f* 102.96 | *f* 155.54 |
| Convertible bond value | CV | *f* 1,000 | *f* 1,000 |
| Cost of straight debt | $k_b$ | 14% | 16% |
| Cost of warrants | $k_w$ | 42.09% | 51.35% |
| Cost of convertible bonds | $k_{cv}$ | 16.89% | 21.50% |
| Cost of equity | $k_s$ | 17.20% | 24.40% |

Conclusion of this sub-section is that convertible bonds are not a cheap form of capital, they are more like an expensive form of capital, due to the high cost of the warrant-component.

## 2.3. Financing with convertible bonds and warrant-bond packages in perfect, efficient and complete capital markets.

In the preceding section we reached the conclusion that the cost of warrants is higher than the cost of bonds and the cost of equity. This means that warrants are relatively "expensive" forms of capital. However, we want to emphasize that an "expensive" form of capital is not necessarily a form of capital that a firm should avoid.

Modigliani and Miller (1958) prove that in case capital markets are perfect, efficient and complete, the investment- and financing decisions are irrelevant for the market value

of the firm. In such a world, where no taxes, no bankruptcy costs and no transaction costs exist, where everyone costlessly possesses the same information and where all required finance instruments are available, the financing decision does not add extra market value to the market value created by the projects themselves. In a world as described above the Modigliani and Miller (1958, page 268) theorem is valid:

"The average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class". This is also true if a firm makes an issue of warrants for cash, a so-called issue of "naked warrants". We have already seen that a firm offers holders of warrants a high rate of return on their investment. This high rate of return can be explained from the fact that a warrant is more risky[21] for investors than other finance instruments, such as bonds or common stock, are. Therefore this higher return that translates into a higher cost, is only based on the fact that investors are compensated for the higher risk. Because warrant holders bear part of the risk that was first borne by holders of common stock, the required return on equity and therefore the cost of equity will diminish. The cost of capital of the firm remains constant. As Duffhues (1990) argues, trading of warrant-risk by the issuer, only leads to a redistribution of existing market risk between the different types of investors. The issue of warrants in perfect, efficient and complete capital markets only leads to a <u>non-value creating</u> trade-off between risk and return. In such a world the fact that warrants are an "expensive" form of capital is neither an advantage nor a disadvantage of this finance instrument[22].

In reality capital markets are not perfect, efficient and complete[23]. In practice market imperfections, market inefficiencies and market incompleteness do exist. In the next section we will discuss a number of these market imperfections, -inefficiencies and -incompleteness that may

lead firms to issue convertible bonds (and of course warrant-bond packages).

## 2.4. The existence of market imperfections, market inefficiencies and market incompleteness.

### 2.4.1. Introduction.

In this section we will discuss market imperfections, market inefficiencies and market incompleteness that may lead a company to issue convertible bonds. First we will define the terms "market perfection", "market efficiency" and "market completeness".

i) Definitions of market perfection, market efficiency and market completeness.

A large body of literature has appeared on the subjects of market perfection, market efficiency and market completeness. After studying this literature Tempelaar and Overmeer (1983, 1986 and 1987) have come to the following classification of these terms.
According to Tempelaar and Overmeer (1987) market perfection is based on the characteristics of "competitivity" and "frictionless markets"[24]. These characteristics can be explained as follows:

1) "competitivity" results in "price taking behaviour", in other words, buyers and sellers, or issuers, of securities take the prices of securities as given; that is, they do, and can justifiably act as if their activities in the market had no detectable effect on the ruling prices;
2) "frictionless markets", this means:
a) all traders have equal and costless access to information about the ruling prices and all other relevant properties of the securities traded;
b) there are no brokerage fees, transfer taxes, or other transaction costs incurred when securities are bought,

sold, or issued;

c) taxes are neutral, that is taxation does not discriminate between income in the form of capital gains and dividends or interest, thus taxation on itself may exist, but it may not discriminate.

Market efficiency is defined by Tempelaar and Overmeer (1987) in accordance with Fama (1970, page 383):

"A market in which prices always "fully reflect" available information is called efficient."[25].

Tempelaar and Overmeer (1987) define complete markets as markets where by combining all available securities in security-portfolio's every possible future distribution can be exchanged for a present-day (certain) amount. Or to follow the definition of Van Horne (1985, page 621):

"A complete market exists when every contingency in the world corresponds to a distinct marketable security".

Summarizing: market perfection includes "competitivity" and "frictionless markets", market efficiency refers to the quality resulted from market prices and market completeness is related to the potential on the securities market.

ii) Market imperfections, -inefficiencies and -incompleteness applied to convertible bonds.

Based on finance literature written about on this subject, and our own ideas, we come to the following motives for the use of convertible bonds based on market imperfections:

- managers often underestimate the cost of equity, and therefore the cost of warrants;
- convertible bonds are relatively[26] insensitive to the risk of the issuing company, this leads to a reduction in (a) information costs and (b) agency costs;
- convertible bonds are a means to resolve liquidity problems;
- an issue of convertible bonds may lead to a reduction in flotation costs.

Market imperfections also include institutional factors of

which the most important are:
- accounting aspects;
- fiscal aspects.

Existing market inefficiencies may be important for the companies choice to issue convertible bonds, this may be the case if:
- the underlying stock is undervalued;
- the underlying stock is overvalued.

Finally convertible bonds can also serve a role in making the market more complete.
Each of these motives will be discussed in a separate subsection.

### 2.4.2. An underestimation of the true costs of convertible bonds.

A possible motive for the issue of convertible bonds is that in practice the cost of equity receives little or no attention in the finance decision. In practice it is often stated that the cost of equity consists of the dividend yield. Consequence is that the cost of warrants is also misunderstood. This also proved to be the case in two papers presented on a conference about equity warrants and convertibles (London, 4th and 5th April, 1989).
At this conference Jabre (1989) stated:
"Generally a market that increases a lot will see a large number of new issues in convertible and bonds with warrants because companies will get a cheaper source of financing than with straight bonds."
Obviously Jabre (1989) fails to understand the fact that warrants have any cost at all, in fact he considers warrants as a "free lunch".
Somewhat more sophisticated, but still wrong, was a statement made by A Brassard (1989) at the same conference:
"The cost of equity linked financing will fall between the costs of equity and debt being determined by the number of years of "cheap" debt"[27].

In section 2.2.3 we have already seen that the cost of a convertible falls between the cost of debt and the cost of warrants, not between the cost of debt and the cost of equity.
Such statements lead us to conclude that in practice the cost of convertible bonds is not clearly understood. In section 2.2.3 we have seen that the costs of these financing resources consist of the cost of debt weighed by the debt-component and the cost of warrants weighed by the warrant-component.
One factor responsible for financial innovation that is mentioned by Finnerty (1988) is academic work that resulted in advances of financial theories or better understanding of the risk-return characteristics of existing classes of securities[28]. Based on the belief in practice that warrants are "cheap capital" we argue that better understanding of the risk-return characteristics of warrants might result in less issues of convertible bonds. In other words, our belief is that one market imperfection responsible for the use of convertible bonds and warrant-bond packages is the fact that its true cost is often misunderstood.

### 2.4.3. The relative insensitivity to the risk of the issuing company.

The motive for the use of convertible bonds (and of course warrant-bond packages) that has received most support in international finance literature is the relative insensitivity of the package consisting of bonds and warrants to the risk of the issuing company[29]. This motive can be explained as follows.
In section 2.2.3 we have already seen that in case of straight debt, higher risk associated with a company's operations results in higher interest costs. We have also seen that companies with higher operating and financial risk tend to have more volatile stock prices, which has a profitable effect on the value of the warrant. This is due to

the fact that the holder of a warrant profits from an increase in the stock price, but is protected against a decline below the exercise price. The fact that the value of ordinary bonds is negatively influenced by an increase of risk, while the value of the warrant is positively influenced by an increase of risk, causes convertible bonds to be relative insensitive to the risk of the issuing company. Based on this fact, Brennan and Schwartz (1986) mention the following three advantages of convertible bonds:

i) the inclusion of warrants in a debt-package offers a kind of "financing synergy" for high risk companies;
ii) the insensitivity to risk makes it easier for the bond issuer and the bond purchaser to come to terms;
iii) bondholders are protected against the adverse consequences of management policies which would increase the risk of the company.

Each of these advantages will be discussed in a separate subdivision.

i) "A financing synergy".

According to Brennan and Schwartz (1986) the fact that an increase of risk has a profitable impact on the value of a warrant, means in practice that two companies at different points along the risk spectrum, facing very different costs of straight debt, could issue convertibles with nearly identical maturities, conversion rights and coupon rates. Their illustration of such a case is presented in table 4.

Table 4: Coupon rates required on new issues of straight and convertible debt.

| Company Risk | Medium | High |
|---|---|---|
| Convertible debt | 11% | 11.25% |
| Straight debt | 14% | 16% |

Brennan and Schwartz (1986) argue that while the terms of the convertible debt sold by the medium and high risk companies are almost identical, the proportions of the convertible's

value which are accounted for by the straight debt element (B) and the warrant element (W) are quite different. For the higher risk company less of the convertible's value is accounted for by the straight debt component, and correspondingly more by the conversion or warrant element. In a note Brennan and Schwartz (1986) notice that the cost of the convertible bond is higher for Company H than for Company M because of the larger warrant-component.

Brennan and Schwartz (1986, page 166) express the advantage of convertible debt for high risk firms as follows:

"We are not suggesting, in this example, that convertibles offer higher-risk companies a "free lunch." We are arguing, however, that the inclusion of warrants in a debt package provides a kind of financing "synergy" which allows companies with high and uncertain risk to raise capital on more advantageous terms."

With regard to this argumentation we emphasize that the relevant interest costs are not the coupon-rates, but the required returns on the bonds. In fact Company H sells bonds with a coupon rate of 11¼%, at an issue price of ƒ 844.46. This means that debt is sold at a required return ($k_b$) of 16%. In addition warrants are sold for ƒ 155.54. In our opinion companies with <u>high</u> risk do not raise debt at more advantageous terms, they raise debt at its appropriate cost. Therefore we conclude that there is no incentive per se for high risk companies to issue convertible bonds.

ii) "Easier to come to terms".

Brennan and Schwartz (1986, page 166) continue their argumentation as follows. They present the following argument:

"Consider the further case of a company whose managers believe it to be one of medium risk, but which is perceived by the market to be high risk. Facing a 16 percent coupon rate, when companies of what it deems comparable risk are paying only 14 percent, the management of such a company may

find straight debt prohibitively expensive. Although convertible debt will also appear expensive, because the company must pay 11⅛% percent coupon instead of the 11 percent it considers reasonable, the effect of the divergence in risk assessment between management and the market is much less for the convertible than for the straight debt".
The proposition of Brennan and Schwartz (1986) comes down to the argument that the risk perceived by the bondholders is higher than the actual risk. Therefore they pay less for straight bonds of the firm than they would have if they knew the actual risk. On the other hand they are willing to pay more for the conversion right, because the value of the conversion right is higher if the risk is higher. Therefore management of a firm with uncertain risk will have a preference for convertible debt, because the value of the package of bond and conversion right is relatively insensitive to the risk of the issuing company. This argument is based on "asymmetric information" between the company and the market[30]. Convertible bonds serve in fact to reduce information costs. Based on the arguments presented above, we argue that there is an incentive for companies with uncertain risk to issue convertible bonds.

iii) "A protection against the adverse consequences of management policies".

The third advantage of convertible bonds mentioned by Brennan and Schwartz (1986) is that convertible bonds protect the bondholder against adverse consequences of management policies.
This argument was already put forward in 1976 by Jensen and Meckling. They present a framework in which the owner-manager of a firm, who retains complete control over the firm, attracts outside capital in the form of outside equity and/or risky debt. Jensen and Meckling (1976) demonstrate that financing through the issuance of common stock or debt to outsiders engenders costs of which we mention:

- costs following from the manager's propensity to consume non-pecuniary benefits or perquisites (perks) by employing certain resources in excess of their optimal usage[31];
- costs following from the manager's propensity to engage in high risk investment projects so as to transfer wealth from bondholders to stockholders.

We will limit our analysis to the last mentioned problem, which is generally referred to as the "risk incentive problem"[32].

Jensen and Meckling (1976, page 335-337) explain the "risk incentive problem" as follows. Consider two projects, which have the same expected total payoff and the same systematic risk, but different variances. The variance of project LOWVAR is smaller than the variance of project HIGHVAR. Jensen and Meckling (1976) assume that the asset prices are determined according to the CAPM. Both projects have the same market value, based on the assumptions of equal total payoff and equal systematic risk. They argue that if the owner has the opportunity to first issue debt and then to decide which of the investments to take he can transfer wealth from the bondholders to himself as equity holder by promising to take project LOWVAR, selling bonds and then take project HIGHVAR. Jensen and Meckling (1976) use the B/S-option pricing model to explain this wealth transfer. The stockholders in the firm can be viewed as holding a European call-option on the total value of the firm with an exercise price equal to the face value of the debt, exercisable at the maturity of the debt issue. Because Merton (1973) has shown that as the variance of the outcome distribution rises, the value of the stock (i.e. call-option) rises, and since the variance of project HIGHVAR is larger than the variance of project LOWVAR, project HIGHVAR has a higher equity value than project LOWVAR. Because we have seen that the market values of the projects are the same, project HIGHVAR must then have a lower bond value than project LOWVAR. If the bondholders cannot prevent the owner-manager from changing the investment

program, and if they perceive that the manager has the opportunity to take project HIGHVAR, they will pay the manager only the bond-value of project HIGHVAR, realizing that his maximizing behaviour will lead him to choose project HIGHVAR. In this case there is no redistribution of wealth between bondholders and stockholders and no welfare loss.

Jensen and Meckling (1976), however, also describe the following situation in which a welfare loss is incurred. If the expected cash flow of project HIGHVAR has a lower expected value than the expected cash flow of project LOWVAR, the value of project HIGHVAR will be lower than the value of project LOWVAR. In this case stockholders may nevertheless have an incentive to choose project HIGHVAR, because the wealth transfer from bondholders to stockholders may be greater than the reduction in the value of the firm. Again the bondholders will perceive the motivation of the equity-owing manager and his opportunity to take project HIGHVAR. They will presume he will take project HIGHVAR and hence will pay no more than the bond value for project HIGHVAR for the bonds when they are issued. The reduced value of the firm (the difference between the value of project LOWVAR and project HIGHVAR) is the agency cost engendered by the issuance of debt and is borne by the owner manager. This welfare loss is generally referred to as "residual loss". Jensen and Meckling (1976) admit that although this reasoning provides some intuitive understanding of the incentives facing the equity holders, the option pricing solutions of Black and Scholes (1973), do not apply when incentive effects cause the value of the firm to be a function of the debt-equity ratio as it is in general and in this example. With regard to the intuitive reasoning based on the Black and Scholes (1973) model, Green (1984, page 115) notes:

"Such appeals to option pricing results rely on models which price claims by taking as exogenous the value of the underlying asset. Yet the same appeals use comparative statics from these models to determine endogenously the value of the firm and argue for its dependence on the structure of

the claims which are issued".

Green (1984) formalizes the intuitive reasoning of Jensen and Meckling (1976) by explicitly modelling the decision problem faced by "insiders" who wish to maximize the value of their residual claim while financing operations with debt. In this modelling Green (1984) abstracts from the potential conflicts of interest between management and equity holders. He succeeds in proving that if a firm has the choice between a risky and a less risky investment project, and the firm has risky debt outstanding, it invests more in the risky project relative to the less risky project, than it would have done if the project were all equity financed. Therefore a "risk incentive problem" indeed exists.

That warrants and conversion rights may serve a role in reducing the "risk incentive problem" has also been suggested by Jensen and Meckling (1976, page 354):
"It seems that the incentive effects of warrants would tend to offset to some extent the incentive effects of the existence of risky debt because the owner-manager would be sharing part of the proceeds associated with a shift in the distribution of returns with the warrant holders"[33].
Green (1984, page 125) makes the following comment on this remark by Jensen and Meckling (1976):
"This conjecture fails to make clear just how this 'sharing' would reduce initial shareholders' incentives to increase the risk of the firm. For instance, if insiders were to simply issue outside equity with the risky debt, they would be sharing any wealth expropriated from bondholders. Yet, it is not clear that this would reduce their incentives to engage in this expropriation. Their claim remains a residual one, even if there are other residual claims outstanding."
This comment made by Green (1984) means that in fact equity holders can still increase their wealth (at the expense of bond holders) by investing in risky projects. Bond holders only get back <u>part</u> of the wealth expropriation, while they

have paid for all of it, therefore the "risk incentive problem" would still exist.
Based on the fact that a warrant is a special equity claim, in the sense that it is only valuable after a certain stock price is realized, Green (1984) proves that it is possible to construct a contract, consisting of a bond and a warrant, that controls the "risk incentive problem".
In an empirical research Long and Sefcik (1990) compare the standard deviation of common stock returns for the periods 259 to 20 trading days prior to and 21 to 260 trading days after the day where a convertible bond-issue (in total 135) or an issue of warrant-bond packages (in total 64) takes place. They conclude that in both cases no significant difference between the pre- and post-issuance mean could be found. Therefore they conclude that both forms of financing tools control the risk shifting problem equally effective.

Haugen and Senbet (1981) argue that the "risk incentive problem" and the "perquisite consumption problem" can be resolved simultaneously. Haugen and Senbet (1981) depart from the original Jensen and Meckling (1976) framework in which the owner-manager of a firm raises capital by issuing outside securities. Haugen and Senbet (1981) notice that if the settlement for external finance includes an external option for the manager to buy back the entire firm, the manager's incentive to consume perks will be reduced, because perquisite consumption reduces the value of his call-option. However, the "risk incentive problem" will increase if the manager holds such an external call-option. Haugen and Senbet (1981) note that this problem can be overcome by including an external put option in the finance settlement. This external put option is written by the owner manager to the outside investors. The put option gives the outsiders the right to sell the entire firm at a stated price to the owner manager at the termination of the period. If the manager shifts to the low value, high variance project (in our Jensen and Meckling example project HIGHVAR) the value of the put option

increases. This is due to the fact that both the increase in variance and the decrease in the value of the firm enhances its value. Haugen and Senbet (1981) demonstrate that the terms for both options can be designed so that the manager will neither have an incentive to consume perks, nor to shift to risky projects.
Haugen and Senbet (1981) state that their use of a call-option is analogous to the use of employee stock options in managerial compensation schedules. They also argue that the put-option, in combination with the common stock of the firm, can be thought of as a surrogate for the convertible bond[34]. For a more elaborate discussion on this matter we refer to Haugen and Senbet (1981) and Barnea, Haugen and Senbet (1985)[35].

iv) Conclusion.

The main conclusions from this sub-section are that the relative insensitivity of convertible bonds to the risk of the issuing company leads to the following advantages:

1) the argument brought forward by Brennan and Schwartz (1986) that convertibles can be issued on terms that look fair to management, even when the market rates the risk of the issuer higher than does management;
2) the advantage first noticed by Jensen and Meckling (1976) and later formalised by Green (1984) that bond holders are protected against the adverse consequences of management policies which would increase the risk of the issuing company; finally we notice that according to Haugen and Senbet (1981), the combination of convertible bonds and employee stock options can simultaneously resolve the "risk incentive problem" and the perquisite consumption problem.

The difference between these advantages can best be expressed by referring to the first advantage as a way to overcome "asymmetric information" and thus information costs and the second advantage as a way to overcome "misleading

information" and thus agency costs.

2.4.4. A means to resolve liquidity problems.

An alternative rationale for the use of convertible bonds is presented by Brealey and Myers (1988, page 534). They present the following reasoning:
"The relatively low coupon rate on convertible bonds may also be a convenience for rapidly growing firms facing heavy capital expenditures. They may be willing to give up the conversion option to reduce immediate cash requirements for debt service. Without the conversion option, lenders might demand extremely high (promised) interest rates to compensate for the probability of default. This would not only force the firm to raise still more capital for debt service, but also increase the risk of financial distress. Paradoxically, lenders' attempts to protect themselves against default may actually increase the probability of financial distress by increasing the burden of debt service on the firm."
The rationale that Brealey and Myers (1988) indicate is that the required return on a warrant is to be paid at the end of its maturity, while interest costs (generally) need to be paid annually[36]. If a firm has investment projects that require relative large cash outflows in the beginning and only pay large cash inflows at the end, it may benefit from the use of convertible bonds. Convertible bonds overcome the market imperfection of a liquidity problem. These liquidity problems are especially relevant for rapidly growing firms.

2.4.5. A reduction in flotation costs.

In case a firm issues convertible bonds, it can save on flotation costs. This saving occurs, because if a firm raises debt capital now and equity capital later, flotation costs will be incurred twice. The convertible bond arrangement allows the firm to incur flotation costs only once and still reach the same objective (provided, of course, the price of

common stock rises to the point where conversion takes place).
Mikkelson and Partch (1986) present statistics for randomly selected US companies who made in total 62 issues of common stock, 147 issues of straight debt and 25 issues of convertible debt between 1972 and 1982. They conclude that the average flotation costs, expressed as a percentage of the total amount offered, are 1.3% for straight debt, 6.0% for common stock and 3.8% for convertible debt. This means that an issue of straight debt followed by an issue of common stock first requires 1.3% and later 6.0% of the total amount offered, while an issue of convertible bonds only requires 3.8%.

### 2.4.6. Accounting benefits.

Firms may prefer the use of convertible bonds and warrant-bond packages, because of the favourable effect they may have on the companies financial reporting. Before we pay attention to the inclusion of warrant-bond packages in the firms financial report we make some remarks on the reporting of outstanding warrants.

With regard to the reporting of outstanding warrants, the Dutch council for annual reporting ("Raad voor de Jaarverslaggeving") has enacted a guideline. This guideline includes that in a note on the shareholders' equity, the following factors should be mentioned:

1) the amount and nominal value of shares on which warrants are written;
2) the exercise price and the maturity of the outstanding warrants;
3) possible special conditions under which the warrants are granted, as well as other relevant information.

These guidelines are not binding, however companies are strongly advised to follow them.
In a research on the reporting of the warrants mentioned in

table 1, Duffhues and Veld (1991) conclude that over 1987, 1988 and 1989 respectively 60%, 50% and 59% of the companies followed the above mentioned guidelines. They find the following deviations from these guidelines:

a) some companies that have warrants outstanding do not mention this on any place in their annual report;
b) some companies present information on outstanding warrants not as a note on shareholders' equity, but on another place in the annual report;
c) some companies do not present all information required following these guidelines.

Veld and Duffhues (1990) argue that accounting for warrant-bond packages in the Netherlands is characterised by a range of permissible methods, of which the most important are[37]:

1) the "discount method";
2) the "par method".

ad. 1) the "discount method".

In table 5 the accounting consequences of the "discount method" are presented for our earlier discussed company H[38].

Table 5: The application of the "discount method" for company H (all amounts are in guilders).

| End of year (1) | Bonds (2) | Paid-in-capital (3) | Coupon interest (4) | Amortization discount (5) | Debt costs (4) + (5) (6) |
|---|---|---|---|---|---|
| 0 | 844.46 | 155.54 | 0 | 0 | 0 |
| 1 | 867.07 | 155.54 | 112.50 | 22.61 | 135.11 |
| 2 | 893.30 | 155.54 | 112.50 | 26.23 | 138.73 |
| 3 | 923.73 | 155.54 | 112.50 | 30.43 | 142.93 |
| 4 | 959.03 | 155.54 | 112.50 | 35.30 | 147.80 |
| 5 | 1,000 | 155.54 | 112.50 | 40.94 | 153.44 |

On the balance sheet it is shown that at the end of year 0, debt with warrants is recorded as debt to the extent of the

debt-portion of the package (column 2) and as common equity (additional paid-in-capital, see column 3) to the extent of the warrant-portion of the package. As debt costs are recognized the coupon interest of ƒ 112.50 (= 11¼% of ƒ 1000, see column 4) and the amortization of the original issue discount (column 5). This amortization equals the difference between the market rate of interest in year 1 (16% of ƒ 844.46 = ƒ 135.11) and the coupon interest (ƒ 112.50), and is therefore equal to ƒ 22.61. The amortization is added to the balance of debt outstanding. Therefore the amount of debt at the end of year 1 becomes ƒ 844.46 plus ƒ 22.61 is ƒ 867.07 [39]. As the debt-issue approaches maturity, the book value of the debt approaches and eventually equals the principle amount of the debt (at the end of year 5, the debt portion is equal to ƒ 1,000).
The "discount method" correctly reflects the economic substance of the transaction. Debt is recorded for its "real" value. The payment for the warrants is considered as the first payment for shares to be issued in the future and is therefore recorded as additional paid-in-capital (see also Tempelaar (1986)). Debt costs are also recorded for their real value.

ad. 2) the "par method".
In table 6 the accounting consequences of the "par-method" are presented for Company H. In this method the package of debt with warrants is recorded as debt from its issuance date. As debt costs are only recognized the payment of the coupon interest costs.From a comparison between tables 5 and 6 we conclude that the "par method" has a more beneficial impact on financial reporting, because it shows lower debt costs than the "discount method", which causes the ratio of "debt costs to total debt" to be lower and therefore the "return on net worth" to be higher. Disadvantage from this point of view for the "par method" is that the debt component on the balance sheet is higher, which causes the "debt-ratio" to be higher.

Table 6: The application of the "par method" for company H (all amounts are in guilders).

| End of year (1) | Bonds (2) | Paid-in-capital (3) | Coupon interest (4) | Amortization discount (5) | Debt costs (4) + (5) (6) |
|---|---|---|---|---|---|
| 0 | 1000 | 0 | 0 | 0 | 0 |
| 1 | 1000 | 0 | 112.50 | 0 | 112.50 |
| 2 | 1000 | 0 | 112.50 | 0 | 112.50 |
| 3 | 1000 | 0 | 112.50 | 0 | 112.50 |
| 4 | 1000 | 0 | 112.50 | 0 | 112.50 |
| 5 | 1000 | 0 | 112.50 | 0 | 112.50 |

We notice that in case of an issue of convertible bonds, the use of the "par method" is obliged. As mentioned earlier, the company has a choice between both alternatives in case of a warrant-bond loan. In a supplementary study Duffhues and Veld (1991) investigate the annual reports over 1987, 1988 and 1989. In total 12 companies had warrant-bond packages outstanding in at least one of these years. Only 4 companies used the "discount method" (Philips, KLM, Stork and NMB), while the other 8 companies used the "par method"[40].

We conclude this sub-section by noticing that companies can and actually do benefit from warrant-bond loans to increase their "paper" "return on net worth". However, it may be expected that as far as financial markets are informational efficient, the paper character of this "advantage" is discovered by market participants. Or as Finnerty (1986, page 81) argues:

"it is doubtful whether such financial reporting benefits per se can have a significant and lasting impact on the stock market value of a company".

### 2.4.7. Fiscal benefits.

i) Tax aspects for the investor.

In February 1986 the Dutch Parliamentary Undersecretary of Finance launched a resolution in which income tax aspects of warrant-bond loans were settled[41]. This resolution will hereafter be referred to as the warrant-resolution. The general belief is that the warrant-resolution not only applies to warrant-bond packages, but also to convertible bonds[42]. The most important contents of the warrant-resolution can be summarized as follows[43]. In case a warrant-bond loan is to be issued, bearing an interest percentage that is more than ½% below the market rate of interest, taxes will have to be paid over the value of the warrant. Two variants exist:

1) the "interest variant" (in Dutch: "rente variant" or "pari variant");
2) the "combination variant" (in Dutch: "combinatie variant" or "disagio variant").

ad. 1) "The interest variant".
If the conditions of the warrant-bond loan do not explicitly mention that part of the issue-price is paid for the warrant, the bond is assumed to be issued at 100%, and the warrant is considered as an interest income received in advance. The warrant-bond purchaser will have to pay income taxes over the value of the warrant in the year of purchase. In case an income tax exempt company buys the warrant-bond package and sells the "naked" bonds to a private person, the latter has to pay an annual tax over the par value of the bonds[44].

ad. 2) "The combination variant".
If the conditions of the warrant-bond loan explicitly state that a specified amount is paid for the bond, and a specified amount is paid for the warrant, the bond is considered to be issued at a discount. In that case interest will have to be paid over the difference between the issue-price and the redemption price, at the redemption date[45].

The difference between these variants can be illustrated for our company H. If the "interest variant" is applied, taxes have to be paid over the value of the warrants, i.e. ƒ 155.54, on the issue date. If the "combination variant" is applied taxes have to be paid over the discount value of the bonds, which is also ƒ 155.54, on the redemption date.
Tempelaar (1986, page 269) provides an equation to calculate the present value of this difference in interest payment[46]:

$$PV(i) = \alpha \left[ W - \frac{W}{(1 + k_b)^n} \right] \qquad (6)$$

where:
PV(i) = present value of the difference in interest payment;
$\alpha$ = marginal income tax rate;
W = value of the warrants;
$k_b$ = cost of debt (market interest rate);
n = difference in period of interest payment.

Assuming a marginal tax rate of 40%, the present value of the difference in interest payment is ƒ 32.59 per warrant-bond package[47].
The warrant-resolution caused a problem for holders of warrant-bond packages issued by companies before the text of the resolution was released[48]. Holders of these warrant-bond packages had to pay interest in advance, because the text of the prospect did not mention that part of the issue-price was paid for the bonds and part of the issue-price was paid for the warrants. Therefore the fiscal authorities applied the "interest variant".

ii) Tax aspects for the issuer.

Van Sonderen (1988) explains the fiscal effects of the issue of a warrant-bond loan by showing how the warrants and the bonds are included on the fiscal balance-sheet.
If the "interest-variant" is applied, the following balance-sheet results with regard to the warrant and the bond (Company H).

| Balance-sheet Company H | | | | | |
|---|---|---|---|---|---|
| Cash | *f* | 1,000 | Bonds | *f* | 1,000 |
| Interest paid-in-advance | *f* | 155.54 | Warrant-capital | *f* | 155.54 |
| | *f* | 1,155.54 | | *f* | 1,155.54 |

As interest expenses are recognized the coupon interest (each year 11¼% of 1,000 = 112.50) and the periodic amortization of the interest paid-in-advance. This amortization[49] varies from *f* 22.61 in year 1 to *f* 40.92 in year 5. After 5 years the component of interest paid-in-advance is reduced to zero. In the warrant-resolution the Parliamentary Undersecretary of Finance states that the "warrant-capital"-component can be considered as a payment of "informal capital" (in Dutch: "informeel kapitaal")[50]. Hofman (1988) argues that the warrant-resolution can also be applied to convertible bond-loans. Therefore he argues that the value of conversion rights can also be considered as informal capital.

If the "combination variant" is applied, according to Van Sonderen (1988), the following balance sheet results for the warrants and the bonds (Company H).

| Balance-sheet Company H | | | | | |
|---|---|---|---|---|---|
| Cash | *f* | 1,000 | Bonds | *f* | 844.46 |
| | | | Warrant-capital | *f* | 155.54 |
| | *f* | 1,000 | | *f* | 1,000 |

In this case debt is recorded under subtraction of the issue discount. The recognized interest expenses are the same as under the "interest variant", i.e. the coupon interest of *f* 112.50 per year and the periodic amortization of the issue discount, calculated as above. Altogether the tax-deductibility of interest expenses does not differ for the "interest-variant" and the "combination variant".

The warrant-resolution does not mention how "warrant-capital" must be considered in case the "combination-variant" is applied.

iii) Conclusion.

We can conclude that, as far as we know, fiscal aspects do not offer a rationale for the use of convertible bonds and warrant-bond packages, that does not already exist for more conventional finance instruments, such as ordinary debt, or (common stock) equity. However, before the Parliamentary Undersecretary of Finance revealed details of the forthcoming warrant-resolution in May 1985 companies might have thought that investors buying their warrant-bond packages could avoid paying taxes over the value of the warrants[51]. In that case, before 1985 a motive might have existed for the use of low interest bearing warrant-bond packages, based on a supposed "tax advantage".
The same reasoning applies to the sale of warrant-bond packages issued under the "interest variant" to income tax exempt investors, in order to pass the "naked bonds" to private persons. This might have been considered as a "tax-friendly" transaction, until the Parliamentary Undersecretary of Finance launched his press release in May 1985.
Finally we mention the fact that, according to Hezemans (1987), the tax authorities do not always succeed in tracing low-interest bearing warrant-bond loans. Therefore many purchasers of warrant-bond packages may have avoided paying income-taxes over the value of the warrants. In 1987, Hezemans (1987) estimated the tax-loss resulting from untraced warrant-bond loans at 50 million guilders.

2.4.8. The case of undervalued stock.

According to Brennan and Schwartz (1986) some companies prefer to issue convertible debt if they think that their

stock is undervalued[52]. Brennan and Schwartz (1986) argue that in such a case the convertible bonds will be less undervalued than the stock. We argue that this will not necessarily be the case. The question whether convertibles are less undervalued than the stock depends on the relation of the straight debt value of the convertible bond to the value of the warrant part of the convertible. Jones and Mason (1986) argue that if the equity is undervalued, the warrants will also be undervalued. In fact, since warrants are like a "levered security", they will be undervalued by a greater percentage than the equity itself. Therefore we argue that if the convertible has a relatively large warrant-component, it may be possible that the convertible will be more undervalued than the stock.
Brennan and Schwartz (1986) and Jones and Mason (1986) argue that in case equity is undervalued, it is preferable to issue straight debt, because straight debt will either not be undervalued, or be less undervalued than both stock and convertible bonds. Therefore Jones and Mason (1986) argue that only if it is impossible to issue straight debt, convertibles may be preferred over equity. We notice that in such a case the warrant component must not be too large, because in that case the undervaluation of the "levered securities" will be more than the undervaluation of the common stock itself. In the latter case an issue of common stock might be preferable.

### 2.4.9. The case of overvalued stock.

Brennan and Schwartz (1986) also discuss the case in which the underlying stock is significantly overpriced. Their reasoning applied to our example of Company H is as follows. Suppose, for example, that the stock of Company H at ƒ 50 is so overpriced that management will be sure that the bond will not be converted. By issuing the convertible, the company would be selling 16 percent debt at a cost of only 11¼ percent. Brennan and Schwartz (1986, page 165) notice

that this is certainly an attractive proposition. However, they argue:
"But how often can management be sure that the conversion option is worthless, unless they are fraudulently concealing information about the company? Moreover, in such circumstances it would almost certainly be better to sell the overpriced stock itself".
We find the reasoning of Brennan and Schwartz (1986) incomplete at best. In the preceding subsection we have already argued that a warrant is a "levered security". Therefore in case the stock is overvalued, warrants will be overvalued by a greater percentage than the equity itself. If the convertible bond has a large warrant component, it might be better to sell convertible bonds, than to sell the stock itself. We also argue that management need not be sure that the conversion option is worthless. The fact that the conversion option is "worth less" than the price the market is willing to pay for it, may be reason enough to issue convertible bonds. Therefore we argue that in case the companies stock is overpriced, a convertible bond issue might be appropriate. Even better, of course, would be an issue of "naked warrants".

### 2.4.10. Market incompleteness.

Convertible bonds and warrant-bond packages may serve a role in making the market more complete.
Brigham (1966) argues that a number of institutional investors (life insurance companies, certain pension funds, banks, and so on) are severely restricted in their ability to hold common stocks[53]. The investment officers of many of these institutions are thought to feel that it would be desirable to have more equities than regulations permit. According to Brigham (1966) convertible bonds provide these intermediaries with a method of indirectly holding more equities than the law permits. This idea is supported by Brigham's questionnaire, discussed in section 2.2.1. From

this questionnaire resulted that 14% of the financial officers mentioned the institutional motive as an additional motive (besides one of the other motives). In this context it would be interesting to investigate to what extent Dutch financial institutions are restricted to hold equities, and in case there are restrictions, whether these institutions consider convertible bonds (or warrant-bond packages) as an alternative for common stock.

Another possibility is that (other) financial institutions are forbidden to hold call-options (traded on the European Options Exchange), but have the possibility to invest in warrants, in case the latter are traded on the Official Market. If this were the case warrants would be a suitable instrument to make the market more complete.

With regard to the preference for convertible bonds by financial institutions Brigham (1966) argues that it is possible that this might, in effect, shift the supply curve for funds placed in the convertible market to the right, thus lowering the cost for convertibles. However, he also considers the possibility that companies would be "oversold" on the use of convertibles, thus causing them to demand an excessive amount of funds through such issues, and making the cost of convertible capital relatively more expensive than other types. Brigham (1966) admits that there is no evidence to suggest that institutional factors create a favourable or unfavorable situation for convertibles. His personal idea, however, is that these institutional factors are probably favourable on balance, but decidly second order in importance.

Brennan and Schwartz (1986) argue that capital market behaviour will show that firms in aggregate supply enough convertibles to satisfy the demand of institutional investors, so that there are no "scarcity rents", or in this case, major cost reductions.

Whether Brigham (1966) or Brennan and Schwartz (1986) are right is an interesting topic for future research. In order to confirm Brigham's (1966) idea, future research should

indicate that convertibles and/or warrants can be issued at a higher price than should be expected based on their risk-return characteristics (in that case firms can sell convertibles and/or warrants at a "relatively" low cost). The research should, of course, also indicate that financial institutions are responsible for these higher than normal prices.
In this context it is interesting to notice that an empirical research by Veld and Verboven (1991), based on the Dutch capital market, indicates that warrants are overvalued in relation to call-options. A similar research for convertibles is more complicated because of the non-separability of the bond and the conversion right[54]. It is interesting to notice that both Duffhues (1990) and Harbrink Numan (1990) suggest that this overvaluation of warrants in relation to call-options may be explained by institutional motives, such as described above. Whether this is really the case, is a matter that needs future attention.
In additional empirical research Veld (1991b) compares model- and market prices for warrants. The model prices are calculated using a historical estimate for the standard deviation. From this research he concludes that on average market prices are much higher than model prices. The outcome of this research is especially interesting, because similar studies for respectively the US and Germany, by respectively Noreen and Wolfson (1981) and Schulz and Trautmann (1989) do not show such an overvaluation. In addition it is mentioned that a study by Stucki and Wasserfallen (1989) for Swiss warrants shows a much lower overvaluation than the overvaluation found by Veld (1991b). Therefore it seems reasonable to conclude that Dutch warrants are not only overvalued in relation to long term call-options, but also in relation to foreign warrants.

## 2.5. Conclusion.

In this section motives for the use of convertible bonds have

been discussed, that are also applicable to warrant-bond packages. In the next section the company's choice between issues of convertible bonds and warrant-bond packages on one side and puttable common stock on the other side will be discussed.

## 3. The choice between convertible bonds and warrant-bond packages versus puttable common stock.

### 3.1. Introduction.

A finance instrument that is closely related to warrant-bond packages and convertible bonds is the combination of a share of common stock and a put-warrant, allowing the holder to redeem the share at a specified exercise price[55]. Chen and Kensinger (1988) refer to the combination of shares and put-warrants as "puttable common stock". According to Chen and Kensinger (1988) a puttable common stock arrangement is generally constructed in a manner that the difference between the exercise price of the put-warrant and the common stock price prevailing at the expiration date is made up by giving the holder shares, cash, bonds or preferred shares.
In sub-section 2.4.3 we have mentioned the put-call parity, which states that the pay-off of a share of common stock and a put-option is equal to the pay-off of a zero-coupon bond and a call-option. Using this put-call parity Chen and Kensinger (1988) demonstrate that the pay-off of a convertible bond is equal to the pay-off of a puttable common stock arrangement. Although the pay-offs of these finance instruments are the same it is possible to identify some differences that favour an issue of puttable common stock and other differences that favour an issue of convertible bonds. Because the advantages and disadvantages of warrant-bond packages are the same as the advantages and disadvantages of convertible bonds, in this section the term convertible bond also refers to warrant-bond packages.
The only issue of puttable common stock in the Netherlands

was an issue of puttable common stock by "AOT Finance" in 1985. In that year AOT Finance introduced shares of common stock with non-separable put-warrants on the Parallel Market of the Amsterdam Stock Exchange. On July 15, 1985 AOT Finance sold puttable common stock for *f* 30, entitling the holders to redeem the shares of a price of *f* 25 at January 29 or January 30, 1987.
In section 3.2 we will see that convertible bonds have advantages over puttable common stock arrangements which are based on market imperfections, i.e. fiscal and legal advantages. In section 3.3 advantages and disadvantages of puttable common stock will be discussed. These are also based on market imperfections, i.e. a reduction in liquidation and agency costs as well as accounting benefits.

## 3.2. Advantages of convertible bonds over puttable common stock.

### 3.2.1. A fiscal advantage: the deductibility of interest costs.

Puttable common stock has an important tax disadvantage compared to convertible bonds. This tax-disadvantage is based on the fact that in case of convertible bonds the firm enjoys a tax deduction for the interest paid. If on the other hand the firm issues puttable common stock, it does not pay interest and therefore it does not enjoy such a tax reduction. Therefore puttable common stock will in practice especially be used by tax-exempt investors.

### 3.2.2. Legal restrictions to the use of put-warrants whereas there are no legal restrictions to the use of convertibles.

Even in case a firm would, notwithstanding the unfavorable tax treatment prefer puttable common stock, caution should be exercised in determining the conditions for the puttable common stock arrangement, because according to Van Westen

(1990) Dutch companies are prohibited from writing put-warrants on their own shares. This is probably the reason that AOT Finance, at its issue of puttable common stock in 1985, created a special foundation which arranged the possible share repurchase. This foundation had received a special guarantee from the Dutch bank "Pierson, Heldring en Pierson" for the repurchase obligations.

## 3.3. Advantages of puttable common stock over convertible bonds.

### 3.3.1. A reduction in liquidation costs.

The fact that the issuer of puttable common stock has the possibility to fix a payment in cash, bonds, common stock or preferred stock, is an important advantage of this finance instrument. Chen and Kensinger (1988) argue that this possibility increases the efficiency associated with the transfer of obligations that takes place in the event of default. In case the company keeps open the possibility to pay off the difference in shares of common stock or preferred stock, the cost of a substantial liquidation can be avoided. These costs can not be avoided in case the difference has to be paid in cash. Chen and Kensinger (1988) argue that, ceteris paribus, this greater efficiency should be reflected in a higher price paid for puttable stock, in relation to convertible bonds, at the time of the issue.

### 3.3.2. The resolution of specific agency problems.

The second advantage of puttable common stock, mentioned by Chen and Kensinger (1988), is that it can resolve specific agency problems, which can not be solved by the use of convertible bonds. As an example Chen and Kensinger (1988) mention the case of General Motors, a company that issued "E-class" common stock, whose dividends are pegged to the performance of a specific division. In such a case the common

stock of a company is divided over different owners who receive differential rewards, although the company is controlled by one single management. Chen and Kensinger (1988) argue that these groups have conflicting interests, therefore agency problems exist. As a solution they suggest to make the special class of stock puttable to the parent company. In such a case the owners will be assured of redress in the event of adverse decisions by the upper management, and therefore they will be willing to pay a higher price for the special class of stock.

### 3.3.3. The treatment of puttable common stock as equity.

The last advantage of puttable common stock identified by Chen and Kensinger (1988) is the fact that, although puttable common stock is a hybrid security, it may, unlike convertible debt, be recorded as equity on the balance sheet. Chen and Kensinger (1988) argue that although the market knows that puttable common stock is a hybrid security it is still more advantageous to present it on the balance sheet as equity instead of debt. In addition Chen and Kensinger (1988) argue that a firm which projects the appearance of financial strength may enjoy more advantageous relations with customers and suppliers. With regard to this argument we recall Finnerty's (1986) argument, presented in sub-section 2.4.6, that it is doubtful that financial reporting benefits per se can have a significant and lasting impact on the stock market value of a company.

## 3.4. Conclusion.

In this section puttable common stock has been discussed. Although the pay-off of a puttable common stock arrangement is the same as the pay-off of convertible bonds and warrant-bond packages, both market imperfections in favour of puttable common stock on one side and market imperfections in favour of convertible bonds and warrant-bond packages on the

other side can be identified. In the next section we will discuss the difference in motives for convertible bonds and warrant-bond packages.

## 4. The choice between convertible bonds and warrant-bond packages.

### 4.1. Introduction.

In this section we will discuss the company's choice between a convertible bond issue and an issue of warrant-bond packages. In order to get an idea of the popularity of warrant-bond loans and convertible bond loans in the Dutch capital markets we present in table 7 the number of warrant-bond loans and convertible bond loans issued by Dutch companies in the Netherlands from January 1, 1976 until December 31, 1990[56]. From table 7 it can be concluded that from 1976 to 1990 almost twice as many convertible bond loans as warrant-bond loans were issued. The popularity of convertible bonds is quite stable over the years, with a peak in the years 1985 and 1986. Since 1983 warrant-bond loans have also gained some popularity.
In section 4.2 we will see that warrant-bond packages have some flexibility advantages over convertible bonds. Besides these flexibility differences it is also possible to identify market imperfections that favour an issue of warrant-bond packages over an issue of convertible bonds and vice versa. In section 4.3 market imperfections that favour warrant-bond packages over convertible bonds will be discussed and in section 4.4 we will study the opposite case.

Table 7: Number of warrant-bond loans and convertible bond loans issued by Dutch companies in the Dutch capital markets from January 1, 1976 until December 31, 1990.

| Year | Number of warrant-bond loans | Number of convertible bond loans |
|---|---|---|
| 1976 | 1 | 4 |
| 1977 | 2 | 1 |
| 1978 | 0 | 1 |
| 1979 | 0 | 0 |
| 1980 | 0 | 2 |
| 1981 | 0 | 0 |
| 1982 | 0 | 0 |
| 1983 | 5 | 1 |
| 1984 | 2 | 1 |
| 1985 | 2 | 8 |
| 1986 | 5 | 11 |
| 1987 | 3 | 1 |
| 1988 | 0 | 6 |
| 1989 | 1 | 4 |
| 1990 | 0 | 0 |
| Total | 21 | 40 |

## 4.2. Extra possibilities in case of the warrant-bond loan.

Based on the fact that a warrant-bond package consists of two separate securities, while a convertible bond is one security in which the features of two securities are combined, two flexibility advantages exist in case of a warrant-bond loan:

- the holder of a warrant-bond package has more possibilities than the holder of a convertible bond;
- it is possible for the issuing company to attract equity

from warrant exercise while the accompanying bonds are still outstanding.

These flexibility advantages of warrant-bond loans will be discussed in two separate sub-sections.

### 4.2.1. A difference from the investors view: detachability versus non-detachability.

The holder of a warrant-bond package has more options available with regard to the tradeability of his securities than a convertible bond holder has. While the purchaser of a convertible bond can:

1) sell the bond and the warrant;
2) hold the bond and the warrant;
3) convert the bond and the warrant into common stock;

the holder of the warrant-bond package can:

1) sell both;
2) hold both;
3) sell the bond and hold the warrant;
4) hold the bond and sell the warrant;
5) sell the bond and exercise the warrant;
6) hold the bond and exercise the warrant.

Options (1), (2) and (5) of the warrant-bond package are analogous to the choices open to the holder of the convertible bond. The others are available only to the holder of the warrant-bond package. Therefore the investor is able to profit from attention on two markets: the market of the "quiet" investors in fixed-interest bearing securities and the market of the more "speculative" investors.

With respect to this difference the issuing company has got a real benefit in case of the warrant-bond package over the convertible bond, because it will generally be indifferent to this free trade-ability, while it can demand a higher price for a warrant-bond package than for a similar convertible bond as a compensation for the inclusion of options (3), (4) and (6).

4.2.2. The possibility to attract equity from warrant exercise while the accompanying bonds are still outstanding.

Cremers (1979, pages 111-113 and 1980) argues that firms have a possibility to incorporate flexibility in the warrant-conditions, that does not exist in case of a convertible bond loan, because it is possible to attract equity from warrant exercise while the accompanying bonds are still outstanding[57]. According to Cremers (1979, page 111) this is interesting in the sense that only one issue is necessary to attract debt and later when the debt is still (partly) outstanding also attract equity. This possibility does not exist in case of a convertible bond issue. In the latter case conversion both leads to a creation of equity, and a disappearance of debt. We will refer to this advantage of the warrant-bond loan as a "liquidity-advantage", because exercise of the warrants results in an improvement of the liquidity. We notice, however, that this advantage also requires extra transaction costs compared with the issue of convertible bonds. In the latter case debt is exchanged for equity, while in case of the warrant-bond loan equity is attracted by the warrant exercise and only after a while debt is redeemed. This incurs transaction costs to be paid twice. This liquidity advantage was probably the most important motive for AT&T in 1970 to prefer a warrant-bond loan over a convertible bond loan. AT&T issued warrants with a maturity of 5 years in combination with bonds, having a maturity of 30 years. According to Scanlon (1972, page 25), the treasurer of AT&T, his firm needed extra cash from 1968 as a consequence of a change in the production program. By attracting a bond loan the direct cash requirement could be fulfilled. The warrants would (if exercised) result in a future improvement of the liquidity and solvency. With an issue size of 1.57 milliard dollars AT&T placed the largest warrant-bond loan in the period from World War II to 1970. The AT&T issue even led the New York Stock Exchange to abolish its prohibition (dating from 1919) against warrant-listing.

We have examined whether this liquidity advantage was also relevant for Dutch firms. In table 8 data with regard to the maturity of the bonds and the warrants have been collected.

Table 8: Maturities of the warrants and average maturities of the accompanying bonds issued in the Netherlands from January 1, 1976 until December 31, 1990.

| Firm | war-rant | Maturity warrant = A | Average maturity bond loan = B | A/B |
|---|---|---|---|---|
| Nat. Ned. '76 | | 12.00 years | 8.50 years | 1.41 |
| W.U.H. '77 | war. A | 0.33 years | 13.00 years | 0.03 |
| | war. B | 10.33 years | 13.00 years | 0.79 |
| Naard.Int. '77 | war. A | 1.08 years | 10.50 years | 0.10 |
| | war. B | 1.54 years | 10.50 years | 0.15 |
| Ahold '83 | | 3.00 years | 8.00 years | 0.38 |
| Bredero '83 | | 2.92 years | 8.50 years | 0.34 |
| K.L.M. '83 | war. A | 0.08 years | 8.00 years | 0.01 |
| | war. B | 4.88 years | 8.00 years | 0.61 |
| Philips '83 | | 5.00 years | 7.00 years | 0.71 |
| V.N.U. '83 | | 3.00 years | 10.00 years | 0.30 |
| Bredero '84 | | 3.04 years | 8.50 years | 0.36 |
| Philips '84 | | 5.00 years | 7.00 years | 0.71 |
| Bredero '85 | | 2.79 years | 8.50 years | 0.33 |
| K.L.M. '85 | | 7.00 years | 12.83 years | 0.55 |
| AMRO '86 | | 5.00 years | 10.00 years | 0.50 |
| Bogamij '86 | | 4.88 years | 8.00 years | 0.61 |
| Staal Bankiers '86 | war. A | 3.25 years | 6.50 years | 0.50 |
| | war. B | 5.25 years | 6.50 years | 0.81 |
| A.B.N. '86 | | 10.00 years | 10.00 years | 1.00 |
| N.M.B. '86 | | 7.00 years | 7.00 years | 1.00 |
| Meneba '87 | war. A | 3.96 years | 10.50 years | 0.38 |
| | war. B | 9.96 years | 10.50 years | 0.95 |

| | | | | |
|---|---|---|---|---|
| v Ommeren '87 | war. A | 3.00 years | 8.50 years | 0.35 |
| | war. B | 5.00 years | 8.50 years | 0.59 |
| Stork '87 | | 4.88 years | 8.00 years | 0.61 |
| KNP '89 | | 4.66 years | 4.99 years | 0.93 |

Cremers (1979, page 112) suggests that the quotient of the maturity of the warrants (A) and the average maturity of the bonds (B) may give an indication for the use of this liquidity advantage. In 18 cases this quotient (A/B) appeared to be smaller than 1. This means that most firms that issued warrant-bond packages wanted equity resulting from warrant exercise before debt had to be repaid. In only 2 cases the maturity of the warrants equalled the average maturity of the bonds (A/B =1). The only warrant-bond loan that had an A/B-factor larger than 1 was the issue by Nationale Nederlanden in 1976. In that case the firm apparently needed equity after the average maturity of the bonds had passed. It is also interesting to notice that in 6 out of 21 cases 2 warrant-types were issued in combination with bonds. In such a case the firm does not have 2 issues in mind, a direct issue of warrants followed by a future issue of equity, but 3 issues, an issue of bonds and two future issues of equity.

## 4.3. Motives for the use of warrant-bond loans over convertible bond loans based on market imperfections.

The following market imperfections favour an issue of warrant-bond packages over an issue of convertible bonds:
- the reduction of specific marketing costs;
- the possibility to swap the accompanying bonds;
- a larger choice in accounting possibilities;
- more favourable stock price reactions at the announcement date.

These market imperfections will be discussed in separate sub-sections.

4.3.1. The reduction of specific marketing costs.

One reason for the preference of warrant-bond loans over convertible bond-loans is that specific marketing costs can be reduced. The nature of these costs and the reason that they are referred to as marketing costs will be explained below.
Besides the flexibility advantage mentioned in sub-section 4.2.1 Cremers (1979, pages 111-113, and 1980) also mentions a flexibility advantage that does not exist in case of a convertible bond loan without an additional- or repayment: the fixation of an unequal amount of potential equity resulting from warrant exercise and debt in the form of the face value of the bonds. With regard to this advantage we notice that no real flexibility advantage exists if the possibility of additional payment or repayment is considered in case of a convertible bond loan. If in case of a convertible bond loan, the firm includes such an additional or repayment arrangement, management has the possibility to easily fix an unequal amount of debt and potential equity. In practice, firms that issue convertible bonds, do not use this possibility very often. A research under the 40 convertible bond loans issued in the Netherlands from January 1, 1976 until December 31, 1990 showed that in only 3 cases an additional payment was included in the conversion arrangement and that in only 2 cases a repayment agreement was included[58]. Therefore, in the other 35 cases the amount of debt equalled the amount of potential equity.
A research under 21 warrant-bond loans showed that in all cases an unequal amount of debt and potential equity was fixed. In 13 cases the amount of potential equity was smaller than the amount of debt. This difference was especially large in case of the warrant-bond loan issued by Bredero Verenigde Bedrijven in 1985. Bredero attracted 35 million guilders by issuing the bonds, while potential equity from warrant-exercise would not be more than 7 million guilders. The best example of a firm that wished to attract

more potential equity than debt was the issue made by Amro Bank in 1986. Amro Bank attracted 244 million guilders of debt, while the amount of potential equity was 360 million guilders.

From our research we conclude that although the flexibility advantage of the warrant-bond loan to fix an unequal amount of equity and potential debt can be duplicated in case of a convertible bond loan, this is only seldom done. A similar problem is identified by Finnerty (1986) who notices that warrant-bond packages contain a certain tax-advantage in the United States over convertible bonds. He describes how to package a unit consisting of debt and warrants into "synthetic convertible debt", the features of which mirror the features of conventional convertible debt. In practice, Finnerty (1986) argues, this technique is not often applied. One potential obstacle Finnerty (1986) identifies is that issuers may be reluctant to deviate from the more typical convertible bond structure, even when there are advantages to do so. Finnerty (1986) considers this as a marketing consideration.

A similar argument is presented in a larger framework by Ross (1989), who argues that marketing performs an important role in finance. The argument of Ross (1989, page 543) is as follows:

"If we think of markets as the perfect and frictionless markets of neoclassical finance, than there is really no role for marketing per se. Selling a financial instrument in a frictionless market is, by definition, costless. However, of course, in practice the less familiar and the more esoteric the instrument, the more costly it is to sell it".

This argument explains why convertibles do no often contain an additional payment or repayment clause. The fact that capital markets have not, or only seldom, been confronted with this special feature, brings certain marketing expenses with them.

4.3.2. The possibility to swap the bonds.

According to Van Westen (1990), treasurer of the Dutch company KNP, a disadvantage of the convertible bond-loan is the fact that, due to early conversion, the bond-loan may disappear. This causes the maturity of the bonds to be uncertain. In case of warrant-bond packages the warrants and the bonds are separately tradeable. Therefore it is possible to swap the debt into another currency (currency swap) or to swap only the interest streams (interest rate swap). This advantage was used by KNP in 1989, when this company placed part of its bond-loan, issued in combination with warrants, in Switzerland. Because future warrant-exercise would not influence the maturity of the bonds, KNP had the possibility to swap the bonds, denominated in Swiss Francs, into Dutch guilders, thereby avoiding currency risk. Notice that this possibility only offers a real advantage if the use of swaps is favoured by market imperfections, market inefficiencies or market incompleteness.

4.3.3. A larger choice in accounting possibilities.

In section 2.4.6 accounting aspects of convertible bonds and warrant-bond packages have been discussed. Issuers of convertible bonds are obliged to apply the "par method", while issuers of warrant-bond packages have the possibility to choose between the "par method" and the "discount method". We have also seen that the "par method" offers the issuing company a relative advantage over the "discount method", because it comes to a higher "return on net worth". However, the "par method" also comes to a higher "debt-ratio", which is a disadvantage of this method.
In practice companies tend to be more concerned over their "profit and loss account" than over their "balance sheet". This is confirmed in practice, because in sub-section 2.4.6 we have seen that issuers of warrant-bond packages generally use the "par method". The fact that the issuing company has

the possibility to choose between the "par method" and the "discount method", therefore only seems to be of little importance. Only for companies, that suffer from a very high debt-ratio this possibility may have some significance.

4.3.4. More favourable stock price reactions to announcements of issues of warrant-bond packages than to announcements of issues of convertible bonds.

Many papers in finance literature are devoted to the reaction of shareholders on announcements of security-issues. In these studies the common stock return from the day before the issue is announced (day -1) to the announcement day (day 0) is determined. The difference between this return and the "normal return" on the same stock is considered as an "abnormal return". In a review of these studies, Smith (1986) concludes that the abnormal returns are on average largely negative in case common stock is issued (-3.14% for industrial firms and -0.75% for utilities), while in case straight debt is offered, only small negative abnormal returns occur on average (-0.26% for industrial firms and -0.13% for utilities).
In several studies the abnormal returns are calculated for issues of convertible bonds and warrant-bond packages. In table 9 the average abnormal returns found in these studies are summarized. From this table it can be concluded that in case convertible bonds are issued, a negative stock price reaction occurs. Although, because of the fact that practically all convertible bonds were issued by industrial firms, it can be concluded that the negative reaction is on average much smaller than in case common stock is issued, which was reported by Smith (1986) to be -3.14% on average.

Table 9: Stock price reactions to the announcement of convertible debt and warrant-bond package offerings. [59]

| Study | Security | Research period | Obs. | Average abnormal return |
|---|---|---|---|---|
| - Dann/Mikkelson (1984) | Conv. bonds | 1970-1979 | 132 | -2.31% ** |
| - Mikkelson/ Partch (1986) | Conv. bonds | 1972-1982 | 33 | -1.97% ** |
| - Eckbo (1986) | Conv. bonds | 1964-1981 | 75 | -1.25% ** |
| - Long/Sefcik (1990) | Conv. bonds | 1965-1984 | 134 | -0.61% ** |
| | Warrant/bond packages | 1965-1984 | 54 | -1.59% ** |
| - Billingsley/ Lamy/Smith (1990) | Conv. bonds | 1971-1986 | 104 | -2.04% ** |
| | Warrant/bond packages | 1971-1986 | 38 | -0.33% |

* = reported by the authors as being significant at the 5%-level;
** = reported by the authors as being significant at the 1%-level.

One of the few explanations for these negative returns that can be confirmed by empirical data is a conjecture by Mikkelson and Partch (1986). These authors argue that managers issue common stock or convertible debt when in manager's view shares are overpriced. Mikkelson and Partch (1986) find their conjecture confirmed by the fact that a negative price reaction occurs if the offering of common stock or convertible debt definitively takes place, while a positive reaction occurs if the issue is cancelled. The conjecture of Mikkelson and Partch (1986) is contradicted by evidence from Billingsley, Lamy and Smith (1990) that only a small (insignificant) abnormal return occurs if warrant-bond packages are issued (see table 9). Based on this evidence Billingsley, Lamy and Smith (1990) refer to an issue of warrant-bond packages as the "penalty-free" issuance of an equity-like security. This suggests that warrant-bond packages have an advantage over convertible bonds, because of the smaller negative stock price reaction. However, Long and

Sefcik (1990) find a much larger negative stock price reaction for an issue of warrant-bond packages than for an issue of convertible bonds (see table 9). This in turn contradicts the evidence found by Billingsley, Lamy and Smith (1990).

We conclude this sub-section by arguing that further empirical research is necessary to fully comprehend the effects of issues of convertible bonds and warrant-bond packages. If issues of warrant-bond packages lead, as Long and Sefcik (1990) suggest, to a negative abnormal return, we suggest a possible method for the further investigation of the Mikkelson and Partch (1986) conjecture to study the stock price reactions in case issues of "naked warrants" or share-warrant packages are announced. Because in sub-section 2.4.9 it has been argued that in case common stock is overvalued, warrants will be overvalued by an even greater percentage, the conjecture of Mikkelson and Partch (1986) would require a larger negative abnormal return from an issue of "naked warrants" or share-warrant packages than from an issue of convertible bonds or common stock.

## 4.4. Motives for the use of convertible bond loans over warrant-bond loans based on market imperfections.

The following market imperfections favour an issue of convertible bonds over an issue of warrant-bond packages:

- the reduction of specific marketing costs;
- lower flotation costs;
- alleged fiscal benefits;
- a better image relative to warrant-bond packages.

These market imperfections will be discussed in separate sub-sections.

### 4.4.1. The reduction of specific marketing costs.

Copeland and Weston (1988, page 478) argue that convertible bonds may be preferred over warrant-bond packages, because

convertible bonds often have a call provision built in that allows a firm to force conversion. Because of this early redemption clause investors do not have the possibility to fully profit from the capital gain on the underlying stock[60]. Of course investors in efficient markets include this possibility in the price they are willing to pay for the convertible bond at the day of its issuance. From a research under the 40 convertible bond-issues that took place from 1976 to 1990 we conclude that in 38 cases the possibility of early redemption was included in the convertible bond agreement[61].

With regard to the remark of Copeland and Weston (1988, page 478) we notice that a firm that issues warrant-bond packages can also include the possibility to call the warrants. From a research under all warrant-issues mentioned in table 1, which do not only include issues of warrant-bond packages but also issues of warrants for miscellaneous reasons, we conclude that in 4 out of 42 cases the firm had the possibility to call the warrants. This was the case with the issues of warrants for cash by Akzo in 1986, VNU and Atag Holding in 1988 and Furness in 1989. If a warrant is called, the warrant holders must choose at the call-date, this is a moment in time that lies before the expiration date, to exercise the warrant rights or to leave them unexpired[62].

It is remarkable that the possibility of early redemption is very popular for convertible bonds, while the call-provision has only seldom been applied to warrants. In sub-section 4.3.1 we saw that only few companies that issued convertible bonds, included the possibility of an additional or repayment. We contributed this to the existence of marketing costs. This argument also explains why so few companies include the possibility to call the warrants. It also explains why the popularity of including a call provision has grown since Akzo introduced this special feature in the Netherlands. After (most) marketing costs were borne by Akzo, it has become less expensive for VNU, Atag Holding and Furness to incorporate this possibility[63].

4.4.2. Lower flotation costs.

Long and Sefcik (1990) argue that different flotation costs exist for issues of warrant-bond packages in relation to convertible bond-issues. From official publications they derive the direct underwriters spreads (from now on spreads) for 121 issues of convertible bonds and 45 issues of warrant-bond packages, made in the USA between 1965 and 1984. These spreads are calculated as the difference between the offering price and the net proceeds to the firm. This difference is expressed in the net proceeds. From these calculations Long and Sefcik (1990) conclude that the average spreads for the convertible bond-issues are 1.8% [64], while the average spreads for the issues of warrant-bond packages are 3.4.% [65]. Although, also other factors such as the size of the issue and the risk of the issuing company determine the level of the spreads, from a multiple regression analysis Long and Sefcik (1990) conclude that the most important factor responsible for the level of the spreads is the type of the issue, in other words the choice between the warrant-bond package and convertible bonds. This choice turned out to be responsible for a difference in spreads of 1.26 percentage points. As explanations for the higher spreads of warrant-bond packages in relation to convertible bonds, Long and Sefcik (1990) mention:

1) in case of a warrant-bond issue more parameters have to be estimated;
2) underwriters set spreads separately for warrants and bonds, while this is not done for convertible bonds;
3) in the US a warrant bond-package is taxable more complex, which involves extra administration costs for the underwriter.

Unfortunately no official publication of the spreads exists for Dutch issues, therefore it is not possible to investigate whether also differences in spreads exist between Dutch issues of warrant-bond packages and convertible bonds.

4.4.3. Alleged fiscal benefits.

In section 2.4.7 we have already concluded that in principle the tax-treatment of convertible bonds and warrant-bond packages does not differ. However, Van der Geld (1990) argues that in practice the warrant-resolution has until "recently" not been applied to convertible bonds[66]. Therefore during some years companies might have thought that they could avoid the consequences of the warrant-resolution if convertibles would be issued, instead of warrant-bond packages. However, we think that in practice the difference in tax treatment has not greatly influenced the choice between a convertible bond loan and a warrant-bond loan.

4.4.4. A "financial weakness image" of warrant-bond packages.

In sub-sections 4.3.1 and 4.4.1 the marketing costs of introducing special features in convertible bond loans and warrant-bond packages are discussed. Another marketing aspect is discussed by Finnerty (1986). In an informal survey under seven of the largest American institutional investors in convertible bonds Finnerty (1986) concludes that all of these investors associate debt with warrants packages with smaller riskier companies, which issue warrants primarily to "sweeten" a straight debt offering rather than to create a convertible bond substitute. Therefore Finnerty (1986, page 81) concludes:
"Debt with warrants, then, may as yet suffer from an image problem. Prospective investors, and perhaps prospective issuers also, may view warrants accompanying a debt package as a sign of financial weakness".
This conjecture is empirically tested by Long and Sefcik (1990) and Billingsley, Lamy and Smith (1990). After comparing characteristics of firms that issue convertible bonds and warrant-bond packages, both Long and Sefcik (1990) and Billingsley, Lamy and Smith (1990) conclude that firms

issuing warrant-bond packages are riskier and smaller than firms that issue convertible bonds. Therefore both Long and Sefcik (1990) and Billingsley, Lamy and Smith (1990) investigate whether different abnormal returns between groups of convertible bond-issues and warrant-bond packages exist. Long and Sefcik (1990) do not find a significant difference between groups, while Billingsley, Lamy and Smith (1990) find that convertible bonds come to significant higher abnormal negative returns compared to warrant-bond packages. Therefore both studies conclude that the use of warrant-bond packages can not be considered as a sign of financial weakness.

### 4.5. Conclusion.

In this section we have seen that, because of the separate tradeability of warrants and bonds, a flexibility advantage exists for the holder as well as the issuer of warrant-bond packages. These advantages do not exist for convertible bonds. Besides that, several market imperfections favour an issue of warrant-bond packages over an issue of convertible bonds. On the other hand also market imperfections can be identified that favour an issue of convertible bonds over an issue of warrant-bond packages. In the next section we will discuss motives for the use of share-warrant packages.

## 5. Motives for the use of share-warrant packages.

It is possible to increase the price of a share of common stock by adding a warrant to it. An example is the issue of packages consisting of shares of common stock and warrants, from now on share-warrant packages, by the Dutch company Akzo in 1983. Akzo received 53½ guilders for each share-warrant package, while according to Meeuwis (1983), the issue-price for naked shares would not have been higher than 47 guilders. Therefore the warrants were implicitly issued for a price of approximately 6½ guilders.
Contrary to the vast amount of literature on motives for the

use of convertible bonds and warrant-bond packages, virtually nothing is written on the use of share-warrant packages. Therefore we will derive the motives for share-warrant packages from the motives for the use of convertible bonds and warrant-bond packages. The following motives mentioned in sub-section 2.4 are also relevant for share-warrant packages:

a) a reduction in flotation costs;
b) the case of overvalued stock;
c) the case of overvalued warrants.

These motives will be discussed below.

ad. a) A reduction in flotation costs.

Just as in case of an issue of warrant-bond packages, see sub-section 2.4.5, a firm can save on flotation costs by issuing warrants and shares together. This saving occurs because in case a firm makes two issues of equity, flotation costs will have to be paid twice. An issue of share-warrant packages allows a firm to incur flotation costs only once and still reach the same objective. Necessary condition is of course that the price of common stock rises to the point where warrant exercise takes place.

ad. b) The case of overvalued stock.

In sub-section 2.4.9 it has already been argued that in case the stock is overvalued, the warrant will be overvalued by a greater percentage than the stock itself. Therefore an issue of share-warrant packages is particularly interesting in case the firm's stock is overvalued. In such a case shares and especially warrants can be sold for an attractive price.

It should be noticed that in case the stock is undervalued, an issue of share-warrant packages is not sensible. In the latter case the stock is undervalued, and the warrant is even more undervalued. If in such a situation the firm needs to attract equity, this can better be done by a plain issue of shares.

c) The case of overvalued warrants .
In sub-section 2.4.10 it was noticed that Dutch warrants seem to be overvalued in relation to long term call-options and foreign warrants. Of course this overvaluation makes it also attractive to issue share-warrant packages.

Finally we notice that accounting and fiscal factors which favoured issues of warrant-bond packages and convertible bonds, neither offer an advantage, nor a disadvantage for a company that issues share-warrant packages. Both for accounting and fiscal purposes, the proceeds from the share-warrant issue are, after deduction of the par value of the shares, added to the "additional paid-in-capital". This correctly reflects the economic substance of the transaction because the price implicitly paid for the warrants has become unconditional capital, which does not have to be paid back. In the next section motives for the use of separate issues of warrants will be discussed.

## 6. Motives for the use of separate issues of warrants.

### 6.1. Introduction.

In the introduction we have already argued that besides issues of warrants in combination with bonds or shares of common stock, also independent issues of warrants occur. Because the motives for these issues are virtually the same, they will all be discussed in this section. Exceptions are made for motives for the use of warrants in an anti-takeover amendment and the use of warrants as a form of employee compensation. Because these last two forms of warrant-issue involve more complex motives, they will be discussed later in two separate sections.

In this section the nature and motives for the following separate issues of warrants will be discussed:
a) an issue of warrants for cash;

b) an issue of warrants as a (partial) payment for a merger or take-over;
c) an issue of warrants as a reward for investment banker's services.
d) an issue of warrants in a reorganization;
e) an issue of warrants as a dividend payment;

## 6.2. An issue of warrants for cash.

In section 1 we have seen that from 1976 to 1990, 6 Dutch companies made issues of warrants for cash on the Dutch capital market. Four of these issues can be characterized as issues of "Deep-In-the-Money" (DIM-)warrants. These are the issues of warrants for cash by Akzo in 1986, VNU and Atag Holding in 1987 and Furness in 1989. In an issue of DIM-warrants, the company issues a warrant with an exercise price that is deep below the stock price at the issuance date. At the time of the issue, the company receives a specific amount in cash while, based on the fact that the exercise price is deep below the stock price, the company can be sure that the warrant will eventually be exercised. Therefore the firm is relatively sure of a future issue of common stock[67].
Motives for the use of warrants for cash can be derived from the motives for the use of share-warrant packages. It is advantageous to use warrants for cash if the underlying stock is overvalued, because in this case warrants are even more overvalued. It is also advantageous to use warrants in case a general overvaluation of warrants occurs as described in sub-section 2.4.10. Because the accounting and fiscal treatment of an issue of warrants for cash is the same as the accounting treatment of share-warrant packages, no accounting and fiscal benefits exist for the use of issues of warrants for cash.

## 6.3. An issue of warrants as a (partial) payment for a merger or take-over.

Sometimes warrants are used as a partial payment for a merger or take-over. In their take-over bids on "VCI Ventures" and "Datex Holding" respectively, "European Development Corporation" and "Getronics" used warrants as a means to partially pay for the take-over price. In this way the firm that makes the take-over bid does not have to pay for the full price in cash, bonds or shares, but it can pay part of it in warrants. This strategy may contribute to motivate the target's shareholders to accept the bid: they keep a chance to the future capital gains of "their" stock.
Motives for the use of warrants as a (partial) payment for a merger or take-over are the same as motives for the use of warrants for cash.

6.4. An issue of warrants as a reward for investment banker's services.

Some authors[68] mention the use of warrants in the founding of a company as a form of compensation to underwriters and venture capitalists. In such a case the underwriter or venture capitalist is (partly) paid in, generally non-tradeable, warrants instead of cash. As far as we know this form of compensation is only seldom used in the Netherlands.
Motives for the use of warrants as a reward for investment banker's services are the same as motives for the use of warrants for cash.

6.5. An issue of warrants in a reorganization.

Cremers and Gans (1977) and Cremers (1979, pages 142-143) mention the use of warrants in corporate reorganizations. In such a case a company, that is no longer liquid or solvent, proposes creditors and/or shareholders to give up specific rights and accept warrants instead. According to Cremers (1979, pages 142-143) this use of warrants especially occurs in the United States.
Motives for the use of warrants in a reorganization are the

same as motives for the use of warrants for cash.

## 6.6. An issue of warrants as a dividend payment.

Sometimes warrants are granted to the firms shareholders as a means of dividend payment. In the Netherlands issues of warrants as dividend payments were made by "Rolinco" (1976), "Bever Beleggingen" (1985) and "Assurantieconcern Stad Rotterdam" (1990). The last two companies granted warrants in the context of their jubilees. In all three cases the warrants were granted as an "extra dividend" on top of the "normal dividend" granted by the respective companies. Warrants may also be granted to stockholders instead of cash and stock dividends. According to Schwartz (1970) eight US companies issued warrants as an alternative dividend payment in 1969. From an inquiry among these companies, Schwartz (1970) concludes that an important reason for the use of warrants as dividends was the possibility to save cash. Schwartz (1970) argues that such an issue makes some sense in a tight money year as 1969, but he argues that, as far as the cash component is concerned, the same goal could be achieved by a stock-dividend or no dividend payment at all.

## 6.7. Conclusion.

In this section we have discussed several separate issues of warrants. For all of these warrants the exercise period is determined before or at the day of issue. In the next section we will discuss a warrant-form that only becomes exercisable under specific conditions, i.e. in case the firm is threatened with a hostile take-over.

# 7. Motives for the use of warrants in an anti-takeover amendment.

According to Malatesta and Walking (1988) since 1984 warrants are also being used in anti-takeover amendments. In that year

the American company "Crown Zellerbach" introduced the so-called "flip-over-plan"[69]. In such a plan the company distributes unexercisable warrants to its shareholders, which have an exercise price that is much above the then prevailing stock price. The warrants only become exercisable after a "triggering event" occurs. Such a triggering event may e.g. be that an acquiring party obtains, or bids for, a substantial block of the firm's common stock. In case an acquiring firm merges with the target firm, the warrants "flip over". This means that the holders are entitled to purchase shares in the surviving firm at a substantial discount from the market price. Assume for example that the discount is 50%, in that case after the merger is consummated, the holder is entitled to purchase shares of common stock of the surviving firm at a price of 50% of the then prevailing stock price. This makes a merger very costly. However, Malatesta and Walking (1988) mention the fact that the acquiring firm can still buy enough shares to go into merger and transfer the assets from the target firm to the acquiring firm. This possibility can be avoided if a "self-dealing flip-in clause" is included. This clause protects the firm against a transfer on unfavorable terms, because in such a case warrant holders other than the large stockholder are allowed to purchase stock at a substantial discount. Malatesta and Walking (1988) argue that in both cases described above, the acquiring firm can simply wait for the expiration of the warrants before merging the firm. The latter possibility can be avoided if the firm introduces a so-called "ownership flip-in clause". In this provision the warrants of the acquiring firm become void in case the company accumulates target stock in excess of a specific amount, which is according to Ryngaert (1988) generally 25% to 50% of the firms common stock. The other warrant holders can buy target stock at the earlier mentioned discount.
In a research Malatesta and Walking (1988) conclude that from July 1984 to March 1986, 116 US firms announced the adoption of "flip-over plans". From these 116 "flip-over plans", 111

contained the "self-dealing flip-in clause" and 46 firms also contained the "ownership flip-in clause". According to Malatesta and Walking (1988) 62 firms announced their plans in the "Wall Street Journal" or the "New York Times". For these 62 firms Malatesta and Walking (1988) calculated average abnormal returns on the announcement dates. These calculations are made on the same way as described in sub-section 4.3.4. On average an abnormal return of -1.16% resulted[70]. From this negative return Malatesta and Walking (1988) conclude that the use of "flip-over plans" reduces shareholder wealth. We notice that, as far as we know, these plans have until now not been used in The Netherlands.

Contrary to the use of warrants in an anti-takeover amendment, Dutch companies often use warrants as a form of employee compensation. This will be discussed in the next section.

## 8. Motives for the use of warrants as a form of employee compensation.

### 8.1. Introduction.

Many companies use some kind of equity compensation because of the expected positive influence on employee moral. This positive influence is believed to result in greater revenues stability and thus higher profits. The most important form of equity compensation is the immediate distribution of shares amongst the companies employees. Another form of equity compensation is the granting of stock options to the employees.
Smith and Zimmerman (1976) define an employee stock option[71] as a form of employee compensation granting the employee the right to purchase a specified number of shares of the firm's stock as long as the employee remains with the company. The condition that the option right expires as soon as the employee leaves the company is not always included in the

terms of Dutch employee stock options. The option is generally written on new shares which are to be issued when the employee exercises his/her right. In this case the term employee stock warrant would better be at place. It is also possible that the option is written on existing shares. In that case the company has to buy in its own shares before the options are exercised[72] [73].
As an example of a Dutch stock warrant plan we mention the issuance of employee stock warrants by the Dutch company "Nutricia". This company has distributed warrants amongst her employees which give the right to purchase shares of "Nutricia Verenigde Bedrijven" at the exercise price of *f* 158. This was also the market price of the stock at the date of grant. The warrants granted in may 1988 expire five years later.
Because motives for the use of employee stock options and employee stock warrants are virtually the same, in this section the term employee stock option will both refer to employee stock options and employee stock warrants. The following market imperfections that favour the use of stock-options as a form of employee compensation will be discussed. In section 8.2 agency costs will be studied followed by section 8.3 where we will see that employee stock option plans enjoy an important fiscal advantage. Finally in section 8.4 we will see that also accounting benefits are attached to the use of employee stock options.

## 8.2. A reduction of agency costs.

In sub-section 2.4.3 the theory of Haugen and Senbet (1981) is discussed. Departing from the case where an owner-manager of a firm raises capital, they demonstrate that the problem of perquisite consumption can be reduced by including an external call-option for the manager. However, because this would increase the risk-incentive problem, Haugen and Senbet (1981) argue that outside investors should be granted an external put-option. According to Haugen and Senbet (1981)

the use of external call-options and put-options is analogous to the use of employee stock options and convertible bonds. We notice that, as far as we know, no empirical test has been carried out to investigate whether companies, controlled by an owner-manager, have simultaneously used convertible bonds (or warrant-bond packages) and employee stock-options in order to reduce agency costs.

Besides the above discussed study of Haugen and Senbet (1981), practically all authors discuss the effect of employee stock option plans together with the effects of other equity-based compensation, such as the distribution of shares to managers. We notice that this discussion only marginally relates to the problem definition of this paper, therefore we restrict ourselves to mentioning the outcomes of the most recent studies on this subject. From a review of the theoretical literature on incentive effects of equity-based compensation, Bhagat, Brickley and Lease (1985) conclude that management which receives some kind of equity-based compensation is most likely to act in shareholders interests. Using the same methodology as discussed in sub-section 4.3.4, Bhagat, Brickley and Lease (1985) study the abnormal returns on common stocks of companies that announce the introduction of tax-neutral based equity based compensation. From this study they conclude that on average these announcements lead to positive abnormal returns. They also conclude that especially plans restricted to the upper management lead to positive returns.
Another type of study is carried out by Agrawal and Mandelker (1987). They study investment decisions by firms which include different amounts of equity based compensation. From this study they conclude that managers of companies that are largely equity-based compensated act in the best interest of shareholders.

## 8.3. Fiscal benefits.

Until July 1987 Dutch tax law did not have a rule for the valuation of employee stock options. Since then the value of an option is, under certain conditions, fixed at 7⅓% of the value of the underlying shares. In this section we will explain that this kind of valuation is very beneficial for the employee that receives such an option. We will compare the results of the fiscal valuation with the results derived from the application of option pricing models.

8.3.1. The 7⅓ percentage rule.

Dutch tax law considers all the benefits that an employee derives from his job as "wages". Wages that are not paid in cash are considered as wages for their market value. If an employee receives a listed option (e.g. an option listed on the European Options Exchange in Amsterdam) this option will be taxed for its market value.
With regard to unlisted options and warrants the Dutch Parliament decided that from July 3, 1987, under the following conditions 7⅓% of the value of the underlying shares will be considered as ordinary income for the employee[74]:

1) the employee must be working for the company that grants the option;
2) the time from the date the option is granted until the expiration date (the maturity) is not longer than five years;
3) the exercise price of the option is:
a) under an unconditional option right equal to the market price of the stock at the date of grant;
b) under a conditional option right equal to the market price of the stock at the day the condition is fulfilled.

In the case of unconditional option rights taxes have to be paid on the day the options are granted. In the case of conditional option rights taxes will have to be paid on the day the restricting condition is fulfilled.
If the above mentioned conditions are not fulfilled the

employee has to pay taxes over the market value of the options. This value will have to be determined by the assessor. The 7½% rule will be applied both for tradeable and non-tradeable options.
In his letter to the Dutch parliament the Dutch Parliamentary Undersecretary of Finance has written that the percentage of 7½ is low because none of the long term options (3-5 years) listed at the European Options Exchange in Amsterdam had a value which was below 7½% of the value of the underlying shares.

### 8.3.2. A comparison of fiscal- and model values.

In section 2.1 we have seen that the value of an option depends on the following factors: the stock price, the exercise price, the standard deviation of the stock's return, the risk-free interest rate, the maturity and the dividend yield. Dutch taxation only takes into account two of the factors that determine option prices, i.e. the stock price and the exercise price.
After comparing the outcomes of the original B/S-model with the outcomes of the fiscal rule Rijkers (1987) concludes that the fiscal rule gives relatively low outcomes.
Important disadvantage of the original B/S-model is that it does not take dividend payments into account. Therefore we will use a special version of the B/S-model, presented by Merton (1973). In this model, from now on to be referred to as the Merton model, dividend payments on the stock are assumed to be paid continuously, so that the dividend yield (g) is constant:

$$C = Se^{-g(T-t)}N(d_1') - Xe^{-rf(T-t)}N(d_2') \qquad (7)$$

where:
$g$ = the dividend yield;
$d_1' = \frac{\ln(S/X)+(r_f-g+\sigma^2/2)(T-t)}{\sigma\sqrt{(T-t)}}$
$d_2' = d_1' - \sigma\sqrt{(T-t)}$.

The outcomes of the Merton model will be compared with the values calculated using the 7⅓-percentage rule. In order to make such a comparison we have selected the data for the companies of which options are traded on the European Options Exchange in Amsterdam.

Data are selected for January 2, 1991. The exercise price of the options (X) has been put on the same level as the market price of the stock (S) in order to fulfil the fiscal condition. The riskless interest rate ($r_f$) is estimated as the daily average yield on government bonds with a maturity of 3 to 5 years (9.24%). Option values are calculated assuming a maturity 5 years. The dividend yield (g) is estimated as the ratio of the dividend paid in the period from January 1, 1990 to December 31, 1990[75] and the average stock price realized in that period[76] [77]. The standard deviation ($\sigma$) is estimated as the implied standard deviation (ISD) of call-options outstanding on January 2, 1991. The ISD is the standard deviation that results if the model price of an option is equated to its market price. However, on January 2, 1991 most companies had several series of call-options outstanding with different maturities and exercise prices. Following Beckers (1981) we have selected the ISD with the highest value for the derivative from the option price to the standard deviation. In case the option price was lower than 50 cents, no ISD was calculated, as the bid-ask spread will typically be large relative to the price of the call-option[78].

The data and the outcomes for the Merton model and the fiscal valuation are presented in table 10 [79].

Table 10: The data, Merton-values and fiscal values for employee stock options of 24 Dutch companies assuming a maturity of 5 years and an interest-rate of 9.24%

| Company | S=X | g | $\sigma$ | Merton-value | fiscal value | (6)/(5) *100% |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Aegon | ƒ 106.00 | 0.051 | 0.237 | ƒ 24.40 | ƒ 7.95 | 32.6% |
| Ahold | ƒ 65.70 | 0.015 | 0.201 | ƒ 21.99 | ƒ 4.93 | 22.4% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Akzo | f 74.00 | 0.075 | 0.398 | f 18.95 | f 5.55 | 29.3% |
| Amev | f 46.20 | 0.049 | 0.249 | f 11.21 | f 3.47 | 31.0% |
| Bührm. T. | f 44.90 | 0.046 | 0.233 | f 10.90 | f 3.37 | 30.9% |
| DAF | f 18.00 | 0.088 | 0.451 | f 4.55 | f 1.35 | 29.7% |
| DSM | f 85.10 | 0.088 | 0.347 | f 16.97 | f 6.38 | 37.6% |
| Elsevier | f 74.30 | 0.022 | 0.245 | f 24.50 | f 5.57 | 22.7% |
| Gist B. | f 27.90 | 0.044 | 0.336 | f 8.55 | f 2.09 | 24.4% |
| Heineken | f 135.70 | 0.029 | 0.147 | f 34.86 | f 10.18 | 29.2% |
| Hoogovens | f 51.20 | 0.086 | 0.340 | f 10.24 | f 3.84 | 37.5% |
| Int Müller | f 68.50 | 0.043 | 0.335 | f 21.17 | f 5.14 | 24.3% |
| KLM | f 19.50 | 0.058 | 0.575 | f 7.65 | f 1.46 | 19.1% |
| KNP | f 36.70 | 0.058 | 0.244 | f 7.87 | f 2.75 | 34.9% |
| Kon. Olie | f 132.30 | 0.055 | 0.150 | f 22.67 | f 9.92 | 43.8% |
| Nat. Ned. | f 48.30 | 0.048 | 0.278 | f 12.65 | f 3.62 | 28.6% |
| Nedlloyd | f 36.10 | 0.048 | 0.545 | f 14.71 | f 2.71 | 18.4% |
| Pakhoed | f 197.00 | 0.036 | 0.247 | f 55.56 | f 14.78 | 26.6% |
| Philips | f 20.00 | 0.045 | 0.418 | f 6.98 | f 1.50 | 21.5% |
| Polygram | f 29.20 | 0 | 0.427 | f 15.06 | f 2.19 | 14.5% |
| Stork | f 40.00 | 0.025 | 0.302 | f 13.99 | f 3.00 | 21.4% |
| Unilever | f 151.90 | 0.032 | 0.138 | f 36.76 | f 11.39 | 31.0% |
| VOC | f 42.80 | 0.048 | 0.416 | f 14.50 | f 3.21 | 22.1% |
| Wessanen | f 62.40 | 0.038 | 0.261 | f 17.67 | f 4.68 | 26.5% |

From this table we conclude that all options had a fiscal value which was lower than the value according to the Merton model. Another conclusion that we can draw from table 10 is that large differences exist between the options of different firms. If a Polygram employee receives an option with a value of *f* 15.06, he only has to pay taxes over *f* 2.19. This means that only 14.5% of the option's value is

considered as ordinary income. Employees of Koninklijke Olie are less friendly taxed, they have to pay taxes over 43.8% of the option's value.
We can conclude that this kind of taxation is especially advantageous for employees who receive long term options written on stock with a low dividend yield and a high standard deviation.

8.3.3. The exemption of employee stock options from Dutch income tax.

According to Dutch tax law employee stock options are exempted from income tax for an amount of *f* 750 per employee per year. This exemption is granted under the following conditions:

1) the employee must be working for the company that grants the option;
2) the options cannot be traded; this restriction does not apply to the acquired shares;
3) the exercise price of the option is:
a) under an unconditional option right equal to the market price of the stock at the date of grant;
b) under a conditional option right equal to the market price of the stock at the day the condition is fulfilled;
4) at least 75% of the employees which are permanent appointed have to be able to take part in the stock option plan.

If the maturity is not longer than five years, the 7½%-valuation rule can also be applied. This means that the value of the underlying shares, on which tax-free options can be granted, is *f* 10,000.
We recall the example of Polygram. To each employee of Polygram options can be granted on 342 shares (*f* 10,000/*f* 29.2 = 342). The value of these options using the Merton model is then: 342 * *f* 15.06 = *f* 5150. This is much more than the formal fiscal exemption of *f* 750.
Notice that the fiscal condition of non-tradeability can

easily be evaded if the employee holds the option, which has been rewarded to him by his employer, and at the same time writes an identical option to an option trader.
We complete this section by arguing that the exemption of employee stock options for Dutch income taxes will especially be profitable for employees of risky[80] companies, with a low dividend yield, this is due to the fact that Dutch tax law uses a rough valuation method for employee stock options.

## 8.4. Accounting benefits.

Based on the fiscal treatment of employee stock options it can be expected that companies will usually set the exercise price of employee stock options equal to the stock price prevailing at the date of grant. In these cases companies make no specific entry in their accounts of the granting of employee stock-options. This implies that notwithstanding the fact that the company grants a compensation to its employee, which leads to (opportunity) costs, neither a cost is recognized, nor an outstanding claim. Therefore the granting of employee stock-options leads to a favourable accounting treatment[81].
With regard to the reporting of outstanding employee stock options the same rules as described for warrants apply (see sub-section 2.4.6). In a research with respect to the annual reports of Dutch companies for the years 1982 to 1985, Eijgenhuijsen, Oudejans and Rietkerk (1987) conclude that a great variety exists both with regard to the place in the annual report where the information is presented as with regard to the amount of information presented. These results are in accordance with the results found by Duffhues and Veld (1991) with regard to warrants (see sub-section 2.4.6).

## 8.5. Conclusion.

In this section we have seen that several market imperfections favour the use of warrants as a form of

employee compensation. These imperfections are the reduction of agency costs, accounting benefits and especially the favourable tax treatment of employee stock-options by Dutch tax law.

## 9. Summary and conclusions.

In this paper motives for the use of warrants are discussed. In finance literature, motives for the use of warrant-bond loans are generally derived from motives for the use of convertible bond loans, which are a close alternative to warrant-bond loans. Therefore the discussion was started with the motives for the use of convertible bonds, that are also applicable to warrant-bond packages. We have seen that convertible bonds are neither a cheap form of capital, nor a deferred sale of stock at an attractive price. In a world of perfect, efficient and complete capital markets, an issue of convertible bonds only leads to a non-value creating trade-off between risk and return. In a world of capital markets that are not (entirely) perfect, efficient and complete, motives for the use of convertible bonds and warrant-bond packages are based on market imperfections, market inefficiencies and market incompleteness. A number of these motives is discussed in this paper.

Also the choice between convertible bonds and warrant-bond packages on one side and puttable common stock arrangements on the other side is discussed. Although the pay-off of a puttable common stock arrangement is the same as the pay-off of convertible bonds and warrant-bond packages, both market imperfections in favour of puttable common stock on one side and market imperfections in favour of convertible bonds and warrant-bond packages on the other side can be identified.

Because of the separate tradeability of warrants and bonds, a flexibility advantage exists for the holder as well as the issuer of warrant-bond packages. These advantages do not exist for convertible bonds. Besides that, several market imperfections favour an issue of warrant-bond packages over

an issue of convertible bonds. On the other hand also market imperfections can be identified that favour an issue of convertible bonds over an issue of warrant-bond packages. Motives for the use of share-warrant packages and separate issues of warrants for miscellaneous reasons can be derived from motives for the use of warrant-bond packages.

We end this paper by indicating some interesting topics for future research:

- In this paper a number of institutional factors (such as accounting- and fiscal aspects) have only been studied for the Netherlands. It would be interesting to make a similar research for other countries, such as e.g. the United States, Japan and the United Kingdom.
- An important question is of course whether our list of motives is complete.
- The last topic for future research we mention, is an investigation of the motives that firms have in practice to issue warrant-bond packages. Are firms still driven by the irrational (traditional) motives? Or, are they aware of the irrationality of these motives and are their decisions based on the rational (modern) motives.

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## Appendix A: Warrants issued in the Netherlands by Dutch companies from January 1, 1976 to December 31, 1990.

### A1 Dutch warrants issued in combination with bonds.

1976 - Nationale Nederlanden
1977 - Naarden Internationaal (warrants A and B)
- Westland Utrecht Hypotheekbank (warrants A and B)
1983 - Ahold
- Bredero Vastgoed
- KLM (warrants A and B)
- Philips
- VNU
1984 - Bredero Vastgoed
- Philips
1985 - Bredero Verenigde Bedrijven
- KLM
1986 - ABN
- AMRO
- Bogamij
- NMB
- Staal Bankiers (warrants A and B)
1987 - Meneba (warrants A and B)
- van Ommeren (warrants A and B)
- Stork
1989 - Koninklijke Nederlandse Papierfabrieken (KNP)

A2 Dutch warrants issued in combination with common stock.

1978 - Nationale Nederlanden
1983 - Akzo
- Gist Brocades
- Sumabel
1984 - Compudata (Parallel Market), later (1985) under the name Tulip Computers (Official Market)
1985 - Asia Pacific Growth Fund (listed in US dollars)
- Hunter Douglas
- MK International Ventures
1986 - Amro

A3 Dutch warrants issued in combination with preferred common stock.

1985 - Canada Overseas Investment Corporation (Parallel Market, listed in Canadian dollars).

A4 Dutch warrants issued for cash.

1986 - Akzo
- Investeringsmaatschappij Nederland Holding (Parallel Market)
1987 - Atag Holding
- VNU
1988 - Holland Sea Search Holding
1989 - Furness

A5 Dutch warrants issued as a payment for a merger.

1987 - European Development Corporation (Parallel Market, listed in US dollars)
1988 - Getronics

A6 Dutch warrants issued as a dividend payment.

1976 - Rolinco
1985 - Bever Beleggingen (listed in US dollars)
1990 - Assurantieconcern Stad Rotterdam

Appendix B: Convertible bonds issued in the Netherlands by Dutch companies from January 1, 1976 to December 31, 1990.

1976 - Bührman-Tetterode 7 1/4%
- Schuitema 8 3/4%
- Stevin 8 3/4%
- Stork 9%
1977 - Wereldhave 7%
1978 - Volker Stevin 8 1/2%
1980 - Bredero Vastgoed 11%
- Elsevier 8 3/4%
1983 - Océ van de Grinten 6 1/2%
1984 - Amsterdam-Rubber 8%
1985 - ABN 5%

- Automobiel-Industrie "Rotterdam" 8 1/4%
- Brink-Molynbeheer 6 3/4%
- Hoogovens 6%
- Koninklijke Nederlandse Papierfabrieken (KNP) 7%
- Nijverdal 6 1/2%
- Proost en Brand 7%
- Verto 6 1/2%

1986 - Bobel 6 1/2%
- Center Parcs 3 3/4%
- Chamotte-Unie 6 1/4%
- Enraf Nonius 5 1/2%
- Holec 8 1/2%
- ICA Holding 6%
- Industrieele Maatschappij 5 3/8%
- Investeringsmaatschappij Nederland Holding 7% (Parallel Market)
- Pie Medical 5% (Parallel Market)
- Samas Groep 5 1/2%
- Wolters Samson-Groep 2 1/2%

1987 - vd Hoop en Co. 5%

1988 - ACF-Holding 6 1/4%
- Hagemeyer 6 1/4%
- Holland Sea Search Holding 8%
- Medicopharma 6%
- NKF-Holding 6 1/4%
- VRG-Groep 4 1/2%

1989 - Fokker 4 3/4%
- Hagemeyer 4 3/4%
- Nutricia 4 3/4%
- West Invest 7 1/2%

Notes:

1. Part of this paper is derived from material earlier published. This is the case for parts of:
- sections 2.2 and 2.3, see Veld and Grazell (1991);
- sub-section 2.4.3, see Grazell and Veld (1991);
- section 2.4.6, see Veld and Duffhues (1990) and Duffhues and Veld (1991);
- section 4.2, and sub-sections 4.3.1 and 4.4.1, see Veld (1989b);
- section 8.3, see Veld (1989a).

2. In this paper the terms "firm" and "company" are used as synonym.

3. In fact this is the definition of an equity call-warrant. The term "call" reflects the right to buy. Also equity put-warrants exist, which give the right to sell back the underlying stock to the company. Duffhues (1990) discusses other warrant types, that give the right to buy other underlying values than shares of common stock, such as bonds.

4. Only warrants are included which have been listed on the Official Market or the Parallel Market of the Amsterdam Stock Exchange (ASE) and which give the right to buy shares listed on the Official Market or the Parallel Market of the ASE.

5. Different is meant in the sense that these warrants differ with regard to the exercise price and/or the initial maturity.

6. The Parallel Market is a market that operates since February 1982 with the aim to enable small and medium companies to trade publicly. Since July 1990 it is called the Official Parallel Market ("Officiële Parallelmarkt").

7. In this paper equity warrants, with a maturity shorter than 30 days, that are used as a dividend payment are defined as preemptive rights. These are not included in table 1.

8. We abstract from the following "academic cases":
- the bond and the warrant (conversion right) are detachable, but the warrant can only be exercised by redeeming the accompanying bond;
- the bond and the warrant (conversion right) are non-detachable, but the warrant can be exercised for cash.

9. In case the holder of the convertible bond has the possibility to convert before the redemption date a complication occurs, because in case of conversion the accompanying bond is redeemed. Before the expiration date the market value of this bond depends on the term structure of interest rates. Therefore the conversion right is in fact a warrant with a changing exercise price (see Veld (1991a, pages 57-59). Our assumption serves to abstract from this complication. Although we are aware of the fact that this is a heroic assumption in practice, we notice that abstracting from this complication is not essential in the context of this paper.

10. See e.g. Brigham (1966).

11. The amount of the opportunity loss is *f* 125 -/- *f* 75 = *f* 50. The amount of the opportunity loss can a priori be reduced if the company includes the right to call the bonds before their maturity. Of course this also leads to a lower (implicit) price for the conversion rights.

12. This objection can be overcome by issuing "mandatory convertible bonds". Mandatory convertible bonds are bonds with contracts that obligate bond purchasers to buy sufficient common stock from the issuer at the conversion price to retire the issue in full by its scheduled maturity date.

13. For reasons of simplicity Copeland and Weston (1988) abstract from taxes and flotation costs. In addition we remark that the B/S-model is only appropriate if the

assumption is made that the underlying stock does not pay any dividends. We notice that in case dividends are paid, an integration of the CAPM and the Merton (1973) model may be preferred, see Veld and Grazell (1991).

14. The relatively high risk of company H is expressed both in a higher total risk ($\sigma$) and a higher systematic risk ($\beta_S$).

15. We abstract from the dilution effect that occurs if the warrants are exercised. This is justified by the demonstration of Schulz and Trautmann (1989) that the outcomes from a dilution-corrected version of the B/S-model only marginally differ from the outcomes of the original B/S-model.

16. The face value of the bonds, is equal to the issue- and the redemption price.

17. The conversion ratio is the quotient of the redemption price (*f* 1000) and the exercise price (*f* 75).

18. Parts of shares, i.e. 0.333 share are assumed to be paid in cash on basis of the prevailing stock price at the conversion date.

19. It is important to notice that even if we assume that the beta of the company's stock is stationary (this on itself is a heroic assumption, see e.g. Van der Hilst (1989, pages 74-84)), the beta of the warrant is not stationary. This is due to the fact that a change in time, causes a change in the factor $N(d_1)$, which causes a change in the beta of the option, and therefore in the beta of the warrant. Because of the fact that beta is not stationary, the required return on the warrant also changes over time.

20. Jarrow and Rudd (1983, page 107) show that in case certain option pricing models are used, a warrant's beta may be lower than the beta of the underlying common stock. This is the case if the call-option price is not convex in each stock price. Jarrow and Rudd (1983, page 107) argue that a sufficient condition for the call price to be convex in the stock price is that the stock return distribution is independent of the stock price. This is one of the assumptions underlying the B/S-model.

21. In this context risk refers to systematic risk ($\beta$).

22. See also Emanuel (1983).

23. Although, according to Duffhues (1988), capital markets are probably more perfect, efficient and complete than they were a few decades ago.

24. These characteristics are to a large extent based on Fama and Miller (1972).

25. Tempelaar and Overmeer (1987) remark that although finance literature agrees over the definition of efficient markets, only little consensus is reached over the conditions that must be fulfilled on markets to be "price efficient". See Tempelaar and Overmeer (1987) for an elaborate discussion on this matter. In this paper we confine ourselves to remarking that efficient markets are markets in which securities are priced correctly.

26. Relative is meant in the sense that convertibles are less sensitive to the risk of the issuing company than e.g. ordinary bonds.

27. About the cost of equity, A Brassard (1989) writes:
"This is obviously governed by a multitude of factors including project growth, gearing considerations and the stance of creditors".

28. The question whether a warrant can be considered as a financial innovation will not be discussed in this paper.

29. See in particular Jensen and Meckling (1976), Haugen and Senbet (1981), Green (1984), Barnea, Haugen and Senbet (1985) and Brennan and Schwartz (1986). Also modern textbooks in finance support this motive, see e.g. Weston and Copeland (1986, pages 851-855) and Brealey and Myers (1988, page 534).

30. A similar argument is presented by Smith (1986, page 10).

31. Jensen and Meckling (1976, page 312) mention e.g. a larger than optimal computer to play with and purchase of production inputs from friends.

32. This problem is sometimes referred to as the "bondholder wealth expropriation hypothesis".

33. With regard to conversion rights Jensen and Meckling (1976, page 354) notice:
"Furthermore, the addition of a conversion privilege to fixed claims such as debt or preferred stock would also tend to reduce the incentive effects of the existence of such fixed claims and therefore lower the agency costs associated with them".

34. This can best be explained by the put-call parity: the combination of a (European) call-option and a zero-coupon bond has the same pay-off as the combination of a (European) put-option and a share of common stock (provided that the exercise price of the call-option equals both the exercise price of the put-option and the nominal value of the zero-coupon bond). For an explanation of the put-call parity see e.g. Jarrow and Rudd (1983, pages 47-59).

35. Notes on the original work of Haugen and Senbet (1981) and Barnea, Haugen and Senbet (1985) have been made by Kudla (1984), Farmer and Winter (1986) and Narayanan (1987).

Responses on these comments have been given by Haugen and Senbet (1986, 1987). We notice that in his comment on Jensen and Meckling (1976), Green (1984) also places a few notes on the Haugen and Senbet (1981) approach.

36. The required return on the warrant is paid in the sense that the warrant-holder, exercises his warrant and receives the difference between the market value of the stock and the exercise price.

37. Veld and Duffhues (1990) also present the ideal "Market Value Method", in which all securities are recorded on the balance-sheet for their true (market) value. They notice however that the use of this method is not permitted in the Netherlands. Because of its more theoretical than practical use, we will not discuss the "Market Value Method" in this paper.

38. Veld and Duffhues (1990) argue that in practice also a "discount method" exists in which an asset is raised to represent the discount and where debt is recorded for its principle amount. Also a variant exists of the "discount method" with regard to the calculation of the discount which differs from the variant presented in table 5. However, Veld and Duffhues (1990) argue that the method presented in table 5 is theoretically most justified. Therefore we will not discuss the other variants.

39. The amortization of the discount in year 2 becomes 16% of $f$ 867.07 = $f$ 138.73 minus $f$ 112.50 = $f$ 26.23.

40. An interesting difference could be noticed with regard to the amortization of the discount over the years. Only NMB used the "amortization-scheme" presented in table 5. The other 3 companies amortized the discount using a linear deduction. Following our example, an annual deduction of $f$ 155.54/5 = $f$ 31.11, results in this case.

41. Resolution no. 286-1547, released on February 26, 1986, published in BNB 1986/113.

42. See e.g. Juch (1985) and Van der Geld (1990). For a discussion of the tax treatment of mandatory convertible debt, see Van der Geld (1990).

43. For a more elaborate discussion on this matter we refer to e.g. Juch (1985), Tempelaar (1986), Van Sonderen (1988), Snijders (1989) and Van der Geld (1990).

44. According to a press release of the Ministry of Finance, November 3, 1988, no. 88/296.

45. For a discussion about the effects if the bond is sold <u>before</u> the redemption date, we refer to Van der Geld (1990).

46. For reasons of uniformity, Tempelaar's (1986) symbols have been replaced by the symbols earlier defined in this paper.

47. $W = f\ 155.54$; $k_b = 0.16$; $n = 5$.

48. Although the warrant-resolution was only released at February 26, 1986, the Parliamentary Undersecretary of Finance, already announced his point of view on May 23, 1985.

49. For an explicit calculation we refer to sub-section 2.4.6 (the "discount method").

50. Van der Geld (1990) defines informal capital as the sum of the advantages that a stockholder grants "his" company in his position as a stockholder, which advantages can not be considered as "formal capital". Formal capital is the sum of common stock and additional paid-in-capital.
For a discussion whether the treatment as informal capital is justified we refer to Bavinck (1988), Van Sonderen (1988) and Snijders (1989).

51. The actual release of the warrant resolution took place in February 1986 (see note 42).

52. This argument has also been brought forward in finance literature, see e.g. the textbook of Levy and Sarnat (1988, page 498).

53. This explanation has also more recently been put forward by e.g. Levy and Sarnat (1988, page 498).

54. Veld (1991a, pages 54-60) discusses the following problems that (may) occur:
1) the bond and the conversion right are not separately tradeable;
2) the convertible bond contains a sinking fund provision;
3) the convertible bond can be converted before its expiration date;
4) the convertible bond, denominated in another currency than the underlying shares of common stock, is convertible at a fixed exchange rate;
5) the convertible bond is callable.

55. In this context also "transferable put rights" (TRPs) should be mentioned. TRPs are distributed to the firms shareholders in proportion with the number of shares owned. They give the right to sell back shares of common stock to the company at a fixed price within a specific period. Therefore TRPs are in fact symmetrical to pre-emptive rights. See Kale, Noe and Gay (1989) for a further discussion.

56. Consistent with the definition in section 1, we have only included the convertible bond loans which were listed on the Official Market or the Parallel Market of the Amsterdam Stock

Exchange, and which conversion rights gave the right to buy shares of common stock of companies that are also traded on the Official Market or the Parallel Market of the Amsterdam Stock Exchange. Because only conversion rights are included that give the right to buy shares of common stock, we have not included the issue of mandatory convertible bonds by HCS Technology in 1989.

57. Cremers (1979, 1980) expresses this advantage as the possibility to fix a different maturity of the bond loan and the warrants. In his explanation, however, he restricts himself to the possibility of attracting equity while keeping outstanding debt. Veld (1989b) has shown that this is not the same. In this paper we will restrict our analysis to the possibility of attracting equity from warrant exercise while the accompanying bonds are still outstanding.

58. An additional payment was included in the convertible bonds issued by VMF Stork (1976), Schuitema (1976) and Amsterdam-Rubber (1984), while the convertible bond-loans issued by Hagemeyer (1988) and Holland Sea Search Holding (1988) both included a repayment.

59. Mikkelson and Partch (1986) and Long and Sefcik (1990) present abnormal returns both for the complete sample and for a smaller sample of convertible bonds or warrant-bond packages where observations contaminated by the occurrence of confounding events are eliminated. In table 9 only the results for the complete samples are included. We notice that the results for the smaller (uncontaminated) samples do not importantly differ from the results of the complete samples.

60. This is partly compensated by the fact that the early redemption clause generally includes a "premium" for early redemption.

61. Exceptions on this rule were the convertible bond-issues made by Hagemeyer in 1988 and West-Invest in 1989.

62. In none of these four cases the warrant holders receive a compensation for the loss of capital gains on the underlying shares in case they are called.

63. This idea is confirmed in a research under US warrants by Long and Sefcik (1990). They conclude that from the 36 warrants issued between 1965-1978 only one warrant was callable, while from the 31 warrants issued between 1979-1984 22 warrants were callable.

64. This 1.8% may not be compared with the 3.8% mentioned in sub-section 2.4.4. The 1.8% presented by Long and Sefcik (1990) is only the underwriters spread, while the 3.8% presented by Mikkelson and Partch (1986) are the total flotation costs.

65. Similar results are found by Billingsley, Lamy and Smith (1990). Because they carry out 2 different tests, they present characteristics for 2 samples which partly differ. The average spreads for the warrant-bond packages are respectively 3.31% and 3.74%, while the average spreads for the convertible bonds are respectively 2.05% and 1.99%.

66. Because Van der Geld's (1990) article appeared in May 1990, we assume that recently indicates the period until the end of 1989.

67. See also Duffhues (1990).

68. See e.g. Duffhues (1990) and Van Horne (1989, page 614).

69. According to Malatesta and Walking (1988) and Ryngaert (1988) "flip-over plans" are part of the family of so-called "poison pill securities". Ryngaert (1988, page 377) defines poison pill securities as:
"a family of contingent securities that impose financial burdens on acquirers when triggered by change-of-control events such as a corporate merger".

70. Ryngaert (1988) makes a similar research under a group of poison pill securities, without making separate calculations for different types of poison pills. He also concludes that on average a (small) negative abnormal return results.

71. In finance literature employee stock options are also referred to as "executive stock options".

72. Eijgenhuijsen, Oudejans and Rietkerk (1987) mention as an example of a company using call-options, Royal Dutch ("Koninklijke Olie").

73. According to Haugen and Senbet (1981) in the US some companies grant their employees stock appreciation rights. In such a form of employee compensation the employee receives the difference between the exercise price and the market price of the stock at the expiration date. The compensation is granted in cash, stock or a combination of cash and stock. This form of employee compensation offers the employees an advantage over stock warrant plans because they do not need to invest cash in order to exercise their rights. As far as we know such a plan has not (yet) been used in The Netherlands.

74. Article 18a of the "Uitvoeringsbeschikking Loonbelasting 1972".

75. These dividends include the total value of the cash-dividends, stock-dividends and preemptive rights granted to shareholders in 1990.

76. The average stock price is estimated as the average of the closing stock prices realized on the first trading day of each month.

77. Because at the end of 1990 a merger took place between the Dutch banks ABN and AMRO into ABN-AMRO-holding no estimation for the dividend yield could be made for this company. Therefore no calculation for ABN-AMRO-holding is included.

78. Just as in section 2.2.3 (see note 17) we abstract from the dilution effect that occurs if we are dealing with employee stock warrants.

79. We notice that three companies did not have call-options outstanding with prices of at least 50 cents, this was the case for CSM, Fokker and NMB-Postbank.

80. In this context the total risk ($\sigma$) is meant.

81. In the United States a similar accounting practice exists. Therefore several authors present alternative accounting methods. Smith and Zimmerman (1976) suggest the use of lower bound option values, while Weygandt (1977) and Noreen and Wolfson (1981) suggest the use of option pricing models to account for employee stock options.

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